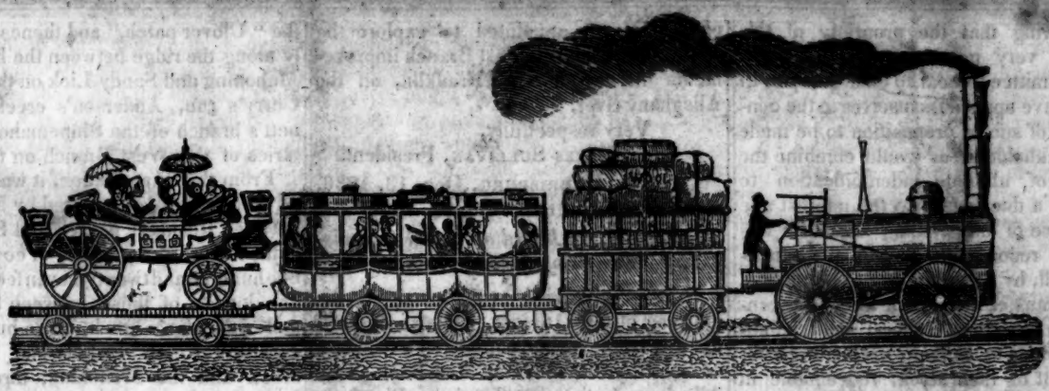

AMERICAN RAILROAD JOURNAL,
AND ADVOCATE OF INTERNAL IMPROVEMENTS.

PUBLISHED WEEKLY, AT NO. 132 NASSAU STREET, NEW-YORK, AT FIVE DOLLARS PER ANNUM, PAYABLE IN ADVANCE

D. K MINOR, and GEORGE C. SCHAEFFER, { EDITORS AND PROPRIETORS. } SATURDAY, JANUARY 14, 1837. [VOLUME V.—No. 2

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NEW-YORK, JANUARY 14, 1836.

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MORRIS CANAL.

We understand that a lease of this Canal has been effected by the Company, for ten years, at 6 per cent. per annum on the cost of the work.

The arrangement is considered as highly advantageous to the Company.

Louis McLane, Esq. has been unanimously elected President of the Baltimore and Ohio Railroad Company.

This gentleman, we doubt not, will prove a highly efficient officer, and his election is gratifying to all well wishers of the Company, and of Internal Improvement.

WELLAND CANAL REPORT.

To the Hon. the Commons House of Assembly:

The Select Committee to whom was referred the petition of the President, Directors, and Company of the Welland Canal, with other documents relating thereto—beg leave to report:

That after actual personal inspection of the whole line of the Canal, from Port Dalhousie to Port Colborne, and from the junction of the Grand River at Dunnville; they are more strongly impressed with the impor ance of this work; and are convinced of the necessity of taking immediate measures for guarding as much as possible against any interference of the use of the canal through the ensuing season—and for putting it in a state of perfect and permanent repair as speedily as the nature of the work will permit.

After much discussion and consideration, your committee are of opinion that a due regard to economy, as well as the urgent necessity of affording facility and certainty to the increasing trade upon this great channel of communication, calls for the adoption without delay, of some decisive and final measure for conducting this great work to a conclusion worthy of the Province, and such as shall ensure the accomplishment of those important results, which your committe are confident cannot fail to be obtained under prudent and energetic management.

It is only necessary to pass along the line of the Welland Canal to arrive at the conviction, that the private stockholders, who at an early period invested their capital in the work, underrated the difficulties of so stupendous an undertaking. Considering the obstacles to be surmounted, it has astonished your committee, to see how much has actually been accomplished—but there is much yet to be done—and it is in every point of view important to the Province that a sound and liberal policy should be pursued in respect to the completion, management, and care of the work.

Your committee have for many reasons determined upon recommending to your honorable House, to provide for making the Welland Canal strictly a public work, and wholly and exclusively public property—

and believing that the propriety of this course is very generally acknowledged, your Committee forbear to enlarge upon it.

They have applied themselves to the consideration of such a proposition to be made to the stockholders, as would combine the principle of ultimate indemnification to them, with a due ragard to the interest and convenience of the public; and with this view they recommend that if the stockholders will, by a certain day to be named, agree to transfer their stock to the Government, the Receiver General shall be authorized to issue to them Debentures for the amount of their stock, redeemable in twenty years, with interest half yearly, to commence in 1840, after the following rates, viz:—Three per cent. for the first year; four for the second; five for the next; and thereafter six per cent. until the debentures shall be redeemed. And that as soon as the receipts upon the Canal shall amount to £25,000, in any one year, three per cent. per annum upon the amount invested shall be paid to the present proprietors of stock or their representatives; and when the annual receipts shall amount to £50,000, six per cent. per annum upon their former stock shall be paid, until he legal rate of interest upon the capital invested by them, from the time that it shall have been actually paid in, shall be fully paid.

But your committee contemplated as part of this arrangement, the entire acquisition to the government of all the property formerly owned by the Company along the line of the Canal, with the hydraulic advantages, which they have reason to believe, can be accomplished upon the terms of paying to the purchasers the amount actually expended by them in improvements.

Your committee are of opinion, that such an arrangement would be decidedly advantageous; and so soon as it shall be ascertained whether their proposition is approved of by your nonorable house, they will apply themselves to the details of the necessary means for carrying it into effect.

All which is respectfully submitted.

Jonas Jones, *Chairman.*
John S. Cartwright,
W. Chisholm,
George Rykert,
Charles Bockus,
W. B. Robinson,
H. Norton,
T. McKay,
Charles Richardson,

Committee Room, 29th Nov. 1836.

COMMUNICATION FROM THE CANAL COMMISSIONERS, ACCOMPANIED WITH A REPORT OF B. AYCRIGG, PRINCIPAL ENGINEER APPOINTED TO EXPLORE THE COUNTRY BETWEEN THE WEST BRANCH IMPROVEMENTS AND THE TOWN OF FRANKLIN, ON THE ALLEGHENY RIVER.

CANAL COMMISSIONRS ROOM,
December 15, 1836.

His Excellency, JOSEPH RITNER,
GOVERNOR OF PENNSYLVANIA.

SIR,—By direction of the board, I transmit to you the report of B. Aycrigg, principal engineer appointed to explore the country between the West Branch improvements and the town of Franklin, on the Alleghany river.

Very respectfully,
MOSES SULLIVAN, President.

HARRISBURG, Dec. 13, 1836.

To MOSES SULLIVAN, Esq.
President of the Board of Canal Commissioners of Pennsylvania.

SIR,—We arrived at this place on the morning of the 11th inst., having examined the dividing ridge and completed a connected line from the mouth of Red Bank on the Allegheny to the mouth of the Sinnemahoning, on the West Branch, a distance of one hundred and twenty-eight and one-fourth miles, and taken the requisite notes for a detailed estimate accompanied by a topographical map of the country included in the examination.

No examination was made on the Allegheny since it had been already three times levelled, and the expense of different plans of improvement reported. The length of the time during which we could work being limited, that part was preferred, of which least was known, and therefore having reached the Allegheny we returned to the summit and proceeded eastward, in order if possible to connect our line with the head of the improvements on the West Branch. This, however, we found impracticable, since the river freezing, precluded the possibility of our being accompanied by our tents and camp equipage in a country without roads, where our only means of transportation was by water.

The levels and survey having been taken with the same precision as in the preliminary examinations, for a work whose construction was authorized by law, it will require several weeks to prepare an estimate, and in the mean time the fol owing general view of the subject is respectfully submitted to the board.

Having obtained all the information that was available from the official reports of former examinations, and from individuals who were acquainted with the country to be explored; the greatest reliance was placed upon the account given to me personally, by William Wilson, Esq. having called on him for this purpose, at his residence in Williamsport.

From his examination, he had formed the opinion, that if a water communication could be at all effected, it must be by connecting the waters of Bennett's branch of the Sinnemahoning with those of Sandy Lick, and from his description of the ground, together with his notes of the levels, the conclusion was formed, that although other routes might be practicable, from resources that had been overlooked from the circumstance of their not being obvious, or not observed in a country, the greater part of which is a wilderness, this at least possessed the greatest facilities as far as ascertained. However, to leave nothing uncertain, a crest line was commenced ten miles south of the Franklin turnpike, at a depression in the dividing ridge, between the waters of the Mahoning and Woodside's run, mentioned in Mr. Mitchell's report of 1827, as the "Clover patch," and thence northwardly along the ridge between the heads of the Mahoning and Sandy Lick on the west, and Curry's run, Anderson's creek and Bennett's branch of the Sinnemahoning, tributaries of the West Branch on the east.

From this examination, it was ascertained that the summit reported by Mr. Wilson, between Bennett's branch and Sandy Lick, is the lowest in this range of country, being one hundred and twenty-seven feet lower than the lowest of those between Sandy Lick and Anderson's creek, three hundred and eight lower than any between Anderson's creek and the Mahoning, three hundred and sixty-seven below the Mahoning and Curry's run, and four hundred and fifty-five below the Clover Patch.

The height of all the depressions between the Clover Patch and Boon's mountain, having been thus settled, and Mr. Wilson having previously found that the summit of Elk and West creeks, between the Driftwood and Clarion, and the lowest north of Boon's mountain, was one hundred and eighty feet above the one proposed; the examination was next made to ascertain the amount of water that could be commanded on the summit level at the height proposed by Mr. Wilson, or two hundred feet below the crest of the depression, and from this it was found that the drainage on the eastern side of the ridge would be collected from twenty square miles, and on the western side a fraction over eighty square miles. The different streams mentioned by Mr. Wilson, were not guaged separately since their minimum flow is a matter of no importance, according to the present proposed plan of improvement; but Sandy Lick below the forks of Fall's creek, and containing the water of all these runs together, was guaged during the dry weather and found to yield the insignificant amount of three hundred and seventy-five cubic feet per minute.

This has hitherto been considered an insurmountable difficulty; but when the proper view is taken, proves to be one of the most favorable circumstances connected with the subject, and requires elucidation for those who are not familiar with the western section of the State, or perhaps have never reflected upon its bearing on the subject under consideration.

The geological structure of the country west of the Allegheny mountain, and consequently on the proposed summit, differs materially from that on the eastern side. The rocks lie in horizontal strata, and are principally graywacke-slate, and clay-slate, accompanied by bituminous coal and clay, the three latter almost impervious to water; and hence we find on the summit of narrow ridges, and in dry weather, muddy roads and swampy ground. The surface of the country, also presents peculiar features. Although there is at present, scarcely a piece of high level ground to be found, still the whole of this country must have been originally a rolling table land with innumerable rills, which in the course of ages have worn out deep ravines, leaving the summits of the ridges almost sharp, and the whole together forming what might almost be compared to the roofs of a large irregular

city with their water tight surfaces, discharging the water immediately into the gutters below, and these into the drains, by means of which it is soon carried off, so that in a short time after a rain, hardly a vestage of it remains.

This peculiarity of the western streams, rising rapidly and as suddenly falling, may be aptly illustrated by an example.

As before observed, the flow of Sandy Lick below the mouth of Falls creek, was but 375 cubic feet per minute. On the 10th of September, when at a short distance below this place, but without any intervening stream of importance, we had a thunder storm in the afternoon and night, and found the water on the next day flowing at the rate of 21,437 cubic feet per minute; and again in two days reduced to 2,371 cubic feet per minute.

Could the water find its way into the earth as it does in the eastern section of the State, or on Boon's mountain, or if retained by land comparatively level, the streams would neither rise nor fall so rapidly, and being fed by springs from these natural reservoirs, would present a more imposing appearance in a dry season; but at the same time the total amount discharged by the streams, would be less in proportion to the water retained over an extended surface, and consequently exposed to evaporation in a much greater degree, than in a comparatively dry country. If there was no basin that could by artificial means be converted into a reservoir capable of containing the water, we should lose the benefit of nearly all the floods; but in this respect, the valley of Sandy Lick creek is remarkably favorable; since even in this elevated region, a mound of ⅜ of a mile and extreme height of 40 feet, will give us a reservoir of three square miles, with a useful depth of twenty feet. This reservoir will at the depth of twenty feet, contain 1,672,704,000 cubic feet of water. A lock proposed to be fifteen by ninety feet, and lift near the summit five feet, will contain 6,750 cubic feet. Suppose it practicable to pass a boat every three minutes, and that every three boats will on an average require two locks full of water at each end of the summit, (though in a crowded trade such as we are now considering, it would approach nearly to one lock full for two boats.) This would require one lock full every two and a fourth minutes, or 156,600 locks full in two hundred and forty days to pass 115,200 boats, requiring for lockage 1,036,800 cubic feet per annum. Allow fourteen miles to be constantly supplied from the summit at the rate of fifty cubic feet per mile per minute for wastage, and the loss would be 241,920,000 cubic feet per annum, which added to the lockage water, makes 1,278,720,000 cubic feet per annum, and leaves a surplus of 493,894,000 cubic feet, or nearly one fourth of the whole, after allowing the boats to pass the locks more rapidly, and the lockage and wastage water to be greater than will be the case, unless the canal should be supplied with double locks.

This calculation is made from the reservoir once full. But supposing the trade to continue eight months, and the rain to fall and be drawn off regularly, the amount used might be three times the full of the reservoir, and consequently its extent would be amply sufficient.

The rain and snow that have fallen in Lebanon during the last seven years, have averaged 40.46 inches, the least being 34.49, and greatest 44.78. But nine inches on an area of eighty miles is sufficient to fill the proposed reservoir, and consequently, if we obtain twenty-six per cent. of the smallest amount that has fallen at Lebanon during the last seven years, (and the opinion appears to be general, and perhaps well founded, that there is more rain on the summit than in a lower and more level country,) we shall, with the most active trade, have a surplus of one-fourth of the whole amount. But from several years intimate knowledge of the large reservoir on the Union Canal, and the country that supplies it with water, and a comparison of the same with the district under consideration, I should anticipate the probable amount collected at two-thirds or perhaps three-fourth of all that falls.

However should this not be considered sufficient, we can command the water from twenty additional square miles on the eastern side of ridge, and being sensible of the prevailing opinion, that a water communication was impracticable, it was thought best to reduce to a certainty the whole of the available resources of the summit, and a level carried over the dividing ridge to Little Toby, from this it was found that by elevating the water one hundred and twenty feet, the whole of Little Toby could be thrown into the summit. The natural flow of this stream, would of itself be sufficient to support an active trade, and by reservoirs the supply increased to any desirable extent. But this I consider altogether unnecessary, and the examination was merely made to remove all doubts from the minds of those who have to decide the question.

The summit level, including the tunnel and reservoir, being unusual in its arrangement, it may not be improper at the present time to give a description of the plan proposed to suit the exigencies of the case.

It is proposed to construct a canal on a level with the tunnel, (which will not vary materially from 1¼ miles in length,) having all the usual arrangement for feeding from the natural flow of the streams, in the same manner as if there was to be no reservoir occupying the same ground, with the exception of having a high tow-path on the hill side, and the outer bank protected from washing by a stone covering. This being completed, a dam is thrown across the lower end of the valley, raising the water over the whole of this work, so that in high water nothing would be seen except a large artificial lake with a towpath skirting its margin and locks at each end. The water would be retained in this position by four locks, at each end. The water would be retained in this position by four locks placed near the tunnel and four of similar construction at the dam, all having their bottoms on the same level, and consequently those nearest the reservoir might be used for locks of 20 feet lift, and the others successively 15, 10 and 5 feet lift. According to this arrangement the boats passing through the tunnel will lock up into the reservoir through the 4 locks, each raising it 5 feet in the same manner, as if they were ordinary lift locks with no extra depth of water, and consequently the expense in each instance is equal to that of a 5 feet lock, (the proposed lift of the locks between the summit and the next supply of water.) As the summit is drawn down, the lift of the first lock is reduced, until at 5 feet from a full height the gates of the first lock are thrown open, in the same manner as those of a guard lock, after the flood has subsided, and the boats pass through without obstruction. The next 5 feet throws another pair of locks open, and so on successively for the third and fourth pair, when the reservoir will be shut out from all connexion with the canal, which will now receive the water from the natural flow of the runs and from lateral reservoirs should such be found necessary. In case of flood, the surplus water would pass under the canal and deposite its sediment into the body of the reservoir, and as the waters rise the locks would successively come into use, until the reservoir was full, and the surplus water pass off over a waste weir in the dam.

The distance from the dam, at the western end of the reservoir to the Allegheny, (pursuing the proposed line and cutting off by deep cuts and short tunnels 9.10 miles, from the united lengths of Sandy Lick and Red Bank,) will be sixty-five and one half miles, and descent five hundred and eighty-two feet. The distance from the same point, to the West Branch, at the mouth of the Sinnemahoning, will be sixty-two and three-fourth miles, and lockage seven hundred and three feet, effected on the West by eighty-three locks, and on the east by one hundred.

To the question, whether there may not be some other route as good or better, than the one proposed? I answer that I think not.

For the first three months, I was constantly in advance of the party, that no point might be omitted which presented the least probability of being important; and of all such, an accurate examination was made with the instruments, a detail of these would however, be of no interest except to persons in the vicinity. Accompanied by a woodsman as guide, and a security in case of accident in the wilderness, I have traversed the whole country on foot, headed the streams, examined the valleys, and believe that I have a thorough knowledge of all that is important to the present question, from the Clover Patch, on the south, as far north as the summit between the Driftwood, and the Clarion, and consider the proposed route, the one distinctly pointed out by nature, as the main channel of communication between the east and west. South of this there is nothing worthy of notice, by way of comparison. The summits are higher, and supply of water deficient; while on the north, the summit of Elk and West creeks, which alone is worthy of notice, is one hundred and eighty feet higher, the supply of water, at least doubtful, and the expense of construction far greater, as the Clarion is subject to

much higher freshets than Sandy Lick, and Red Bank, and consequently requies the construction of very heavy embankments in the bed of the river; since, according to notes taken from point to point, during a reconnoisance, made for the purpose of ascertaining its character, I found about two thirds of the distance from the town of Ridgeway, to the mouth of the Clarion, or sixty-six out of one hundred miles, to be steep bluff, while Sandy Lick shows the reverse of this, or two-thirds of flats. For slack water it is less favorable, as it is larger and as before observed, subject to higher freshets, and the rapid descent of either stream, would make a continuous slack water very expensive, from the great number of dams required. The distance by the two routes, is so nearly the same that by the course of the streams the Red Bank route would be about four miles longer, but by the line, five miles shorter than the natural course of the Clarion when taken between the mouth of the Sinnemahoning, and the connexion of the two routes, at the mouth of the Clarion; twenty-two miles of the middle, or Sandy and Red Band routes being on the Allegheny, and therefore, so much toward the improvement of that river. But when considered with reference to the distance to Pittsburg, the mouth of Red Bank, is twenty-two miles nearer, than the mouth of the Clarion, and an additional thirty-six miles below the Red Bank, along the Allegheny, would complete the connexion to Pittsburg and therefore open the way not only from Pittsburg and Franklin, to the east, but likewise between these two places. From all these circumstances, I was left in no doubt as to the proper position for the line, and therefore made a minute examination of the one already discribed.

Having commenced the examination with a full determination of not taking the responsibility of recommending the construction of a canal, unless I could command on the summit, double the amount of water that a close calculation would show to be necessary, and this beyond a doubt, but in such case to report the facts and leave others to draw their own conclusions, without my expressing an opinion, it gives me great satisfaction to state, that my most sanguine anticipations have been more than realized, and that the problem which possessed double interest from the importance and supposed impracticability of the work, has been fully solved in my own mind, and that an improvement which before the examination, I considered a bare possibility, is now almost reduced to a certainty, and I confidently look forward to the period when large boats will leave the wharf at Philadelphia, and deposit their cargoes at Pittsburg, or Lake Erie. It may not be in one, two or ten years, but that every avenue to the west will be crowded, and the remarkable facilities here presented, will be one day improved, is a subject upon which I have no doubts. Although the existing prejudice against reservoirs, for the supply of water, many for a while retard the work; this will gradually wear off, the canal be constructed, support an active trade, make the West Branch canal a good investment, and be used as an example to convince others, that improvements which at first sight appear impracticable, may nevertheless be effected, and the country at large receive the benefit of a thorough water communication from the east to the west.

All of which is respectfully submitted,

B. Aycrigg.

Principal Engineer, appointed to explore the country between the head of the West Branch improvements, and the town of Franklin, on the Allegheny.

From the London Mechanics' Magazine.

FIRST REPORT OF THE DIRECTORS OF THE EASTERN COUNTIES RAILWAY.

(Read on the First General Meeting held at the London Tavern, 26th September, 1836.)

The Act for incorporation of this company received the Royal assent on the 4th of July last, and by one of its provisions, the first general meeting of the share holders is appointed to be held within *six* months after the passing of the act; but the directors, feeling persuaded that the sooner they could make officially known to the proprietary and the public the actual state and prospects of the undertaking, the sooner it would attain that high place which it is entitled to hold in public estimation, have called this meeting within less than *three* months from the date of the act; on the earliest day, in fact, which the time unavoidably occupied in organizing the establishment of the company, and in auditing the expenses incurred in its formation, could possibly allow.

Nearly three years have now elapsed since the design of the Eastern Counties Railway was first given to the public, and several preliminary surveys made; but it is not more than ten months since it can be said to have taken any considerable hold on the public mind. The month of October last was far advanced before a Provisional Committee of sufficient weight was formed for the prosecution of the undertaking, and there then remained but six weeks within which to make all the necessary preparations previous to going to Parliament in the ensuing session. Within this brief space, the whole line of a hundred and twenty-six miles, the longest that is yet in progress in any part of the kingdom, had to be surveyed, and the maps and sections, required by the forms of Parliament, prepared: the whole of the owners and occupiers too, for a breadth of half a mile, had to be canvassed for their assents, that extreme breadth being taken in order to allow ample scope for such alterations as circumstances might afterwards render expedient. Even when the requisite plans, sections, and books of reference, had by extreordinary exertions on the part of the engineers and their assistants,—exertions which the directors honestly believe to be without a parallel in the history of such undertakings—been deposited in due time, there yet remained much to be done in order to obtain for the undertaking an adequate share of public confidence. Early in November, the chairman and two other members of the Provisional Committee had made a progress through Essex, Suffolk, and Norfolk, for the purpose of personally representing to the leading gentlemen of these counties the claims which the undertaking had to their countenance and support: and also of calling public meetings of the inhabitants to investigate and decide on its merits and the demonstrations of local approbation which this deputation were the means of eliciting, were so numerous and decisive, as to leave the committee in no doubt that they had the hearty concurrence of the counties in their endeavors to carry out the plan to a successful conclusion. But though the good will the counties had certainly been conciliated, the confidence of the monied interests of the country, from whom alone could be expected the bulk of the large capital required for its execution (the largest subscribed during the past year for any railway project,) had still to be gained. The various steps taken to this end, the directors need not stop to detail; it may suffice to state that, by the choice of active and judicious agents, and without having recourse to any adventitious aids to stimulate the spirit of adventure—by simply making known, far and wide, the sterling merits of the undertaking—the greater part of the capital was subscribed before the second reading of the bill. In point of *numbers*, the shareholders residing in, or connected with, the counties themselves, bore a fair proportion to those having no local interest in the line; but the amount of capital subscribed for by them was little more than one-twelfth of the whole. Without the powerful assistance, therefore, derived from other and distant parts—from Manchester, Bristol, Bath, Edinburg, Glasgow, Dublin, and, above all, from Liverpool, the opulent and intelligent citizens of which, ever foremost in the encouragement of great enterprizes, at once subscribed for upwards of 12,000 shares of the company's stock; it may with perfect truth be said, that the undertaking must have fallen (for the present at least) to the ground.

Notwithstanding the success which had so far crowned their exertions, the directors were still but in the midst of their difficulties. A parliamentary opposition had yet to be encountered—an opposition, as it happened, of a more than usually obstinate character. there were two rival lines in the field, both of a more recent suggestion than the Eastern Counties Railway, neither of them well suited to the wants of these counties, but both, nevertheless, very respectably supported. There was also a formidable array of dinsenting owners and occupiers, headed by gentlemen of great parliamentary influence, and to all appearance irreconcileably opposed to the undertaking.

It was under these circumstances, with no ordinary anxiety, that the directors proceeded before Parliament, and by no ordinary exertions that they were enabled to maintain their ground there, against the serious opposition with which they were met. The second reading of the bill in the House of Commons was not carried without a division; and in the committee, to which it was referred, were several of the most active members of that minority who voted for throwing it out. So strong, however, was the case proved in evidence for the bill, and in so conciliatory a spirit were the opposing parties met and arranged without of doors, that in a short time all opposition was at an end, and the committee unanimously agreed to a report to the House in favor of the

measure, which concludes in the following highly recommendatory terms :—

"Your committee think it right to add that, according to the evidence adduced, the Eastern Counties Railway, between the termini, would traverse the most populous and most cultivated parts of the counties through which it is intended to be carried, and that great benefit would be given to the trade and agriculture by its adoption."

After the bill had passed the Commons, several new and powerful opponents sprung up; but the directors, by meeting the parties with the same promptness, and in the same fair spirit, which had carried them successfully through their previous negotiations, effected amicable arrangements with them also, and the bill was finally passed by the House of Lords, as one, which was now on all hands allowed to have for its object, the accomplishment of a measure of great public utility.

The directors, in giving this brief history of the undertaking, would have been disposed to dwell less on the difficulties they have had to encounter and have overcome, could they by a more reserved course have equally well justified to their constituency the price at which success has been purchased.

The shareholders will see, in the expedition with which the Parliamentary plans, sections, and books of reference were executed—in the more than usual breadth of country which was surveyed—in the great number of persons that it was requisite to employ for that purpose, at a time when hands for employment of this description were scarce, and their terms of renumeration proportionally high—in the numerous agencies which had to be put in motion in order to raise so large an amount of capital—in the many opponents who had to be negotiated and arranged with—and in the very short period within which nearly the whole of these things were transacted;—the shareholders will see in all this, reasons sufficient for anticipating a much larger amount of expenditure than would, under less extraordinary circumstances, have certainly sufficed.

As it is, however, the directors believe that, compared with other railway contests, this will not be found to have been more costly than usual; and instead of having occasion to bespeak your patience for an exhausted exchequer, they are happy to announce that, large as their expenditure has been, that they have still in hand a large and unencumbered balance.

From the balance-sheet annexed it will be seen that the the total receipts of the Company up to the present date amount to 61,845*l.* 2*s.* 9*d.* The claims brought against the company have, by careful revision of these claims, and allowances conceded for prompt payment, been reduced by 2,383*l.*; making the net amount of the expenditure, 36,561*l.* 19*s.* 2*d.*; deducting which from the monies received (61,845*l.* 2*s.* 9*d.*) the balance remaining in hand is 25,845*l.* 2*s.* 9*d.*

When the directors look to the magnitude of the object, which the sum thus expended has been the means of achieving, they think they may fairly congratulate the shareholders upon the general result. In a single session, with no more delay than the forms of Parliament rendered unavoidable, this company has obtained its act of incorporation;—that for which other proprietaries have had to struggle through several sessions, and to pay twice and thrice as much; an act of incorporation, too, which secures to them the perpetual proprietorship of one of the best lines of railway in the whole kingdom, with all the great profits lgitimately derivable therefrom.

The Eastern Counties is not only the longest integral line of railway which has yet obtained the sanction of Parliament, but traverses a larger extent of cultivated and highly productive country than any other; those districts from which the immense population of the metropolis derives its chief supplies of agricultural and marine produce.

From the peninsular character, too, of this portion of England, washed as it is on three sides by the German Ocean and the Thames, it is obvious, that a main-trunk line, which follows, as this does, the ancient and long-established course of traffic, and touches at nearly all the places of greatest business, must draw *and keep to itself* the great bulk of the carrying trade of the district. Other railways may be interfered with, but this never can. As a great main line, it must always stand alone—dividing with no other railway, though receiving the tributary contributions of many.

Another novel and important feature of the Eastern Counties line is, that, notwithstanding its great length, *there will not, from beginning to end, be a single tunnel.*

If at one or two points it goes wider of considerable towns than could be wished, this has arisen from no indifference to the wants of those places, but from the necessity of consulting the general interests of the whole line, and of the majority of those who are to use it, in preference to all minor considerations.

The Eastern Counties Railway will have comptetely fulfilled the purpose for which it was designed, if it serve as the great trunk line of this part of the kingdom, from which branches may radiate into as many of the outlaying districts on both sides, as possess traffic enough to pay for this superior means of communication.

Already not less than six railways, branching from the Eastern Counties line, have been projected with apparently fair prospects of success; all of which, when executed, must contribute more or less to swell the profits of this Company, without involving the necessity of any addition whatever to its capital.

The Directors desire particularly to call attention to the *Thames Haven Railway*, for which an Act of Parliament was obtained in the last session of Parliament, and which is to branch off from the Eastern Counties at Romford. The capabilities of this line are undeniably great. Were it to do no more, than introduce into the heart of Essex a more abundant supply of coal, it would confer an incalculable advantage on that county, and pay the adventurers well; but should it also become, as its projectors confidently anticipate, the great channel for the conveyance of an article of such universal consumption as coal to the metropolis, it would be difficult to assign a limit to its value in a financial point of view. The point chosen for its seaward termination offers also such facilities as a steam-packet station, that there seems strong reason to hope for a large accession of passenger-traffic to both railways from this source.

Next in local order, follow the *Maldon Witham and Braintree*, the *Harwich*, the *Ipswick and Bury*, the *Beceles Bungay and Harleston*, and the *Norwich and Leicester*, branches, which embrace among them nearly all the principal towns of the three counties, which were necessarily left at a distance in the setting out of the main trunk line, but will be now brought by these branches into immediate and productive connexion with it.

To these branches there is yet another to be added, which, though not projected with a view to the wants of any part of the districts immediately intersected by the Eastern Counties Railway, will in all probability prove one of its most valuable tributaries. The Directors allude to the recently projected line of railway from London to Rochester and Chatham, *through Essex*; the communication between the opposite sides of the Thames being effected by a short steam-ferry at Tilbury and Gravesend. By taking advantage of the Eastern Counties and Thames Haven lines for about seventeen miles of the entire distance, this railway will be executed for one-fifth of the cost of any line that can be executed *along the Kentish side of the river.* Although this line takes what may at first sight seem a circuitous course, it will, in fact, be little longer than a straight line between the two termini, and exceed by one mile only the distance by the present high road. The number of passengers to and from those parts of Kent, to which this railway will present the shortest possible communication with the metropolis, exceeds at presnnt one million; and assuming that one-fourth only of this immense passenger-traffic will fall to the share of this railway, this will add 25,000*l.* per annum to the revenue of the Eastern Counties Railway, from a source never thought of, or taken into account in the original calcuulations of its promoters.

According to the estimates, which were produced in evidence before the Committee of the House of Commons, and reported by that Committee to be verified to their satisfaction, the traffic of the Eastern Counties. Railway will yield a return of 22 per cent. on the capital required for its formation.—The Directors have since tested this result in a variety of ways; but so far from seeing any reason to doubt its accuracy, they incline to think that the real facts of the case would have fully justified even a higher estimate.

No credit whatever was taken in the Eastern Counties Railway estimates for any of the passenger-traffic from *transmarine* sources as that traffic was, at best, of a contingent character. But, unless the Directors are greatly mistaken, the traffic from these sources alone will suffice to pay the entire expense of working the line, leaving all the revenue derivable from the home traffic to count as so much clear gain.

The counties of Essex, Suffolk, and Norfolk, stand in such a geographical position as regards the northern continent of Europe,

and the eastern coast of Scotland, as to offer the nearest route *by railway* from all these parts to the British metropolis. Steam vessels from any continental port north of the Texel, or from any port on the east of Scotland, by putting into Yarmouth which they can now do with the greatest facility at all times of the tide, and landing their passengers there, will enable them to reach London by the Eastern Counties Railway, from 15 to 24 hours sooner than they can now do by water, and, on occasions of contrary weather even two days sooner. To the steam-packets again, from the more southern ports of Rotterdam, Antwerp, Ostend, and Dunkirk, the port of Harwich will present an equally accessible harbor, from which the passengers may, with a proportionate saving of time, proceed to London by the Harwich branch of the Eastern Counties line. Yarmouth and Harwich were, it is well known, formerly the principal packet-stations on the Eastern coast of England, but lost that traffic through the introduction of steam-navigation. It was then found, that by despatching the Hamburgh and other north of Europe mails by steam-vessels direct from the Thames, even though these vessels should not leave the river for eight or nine hours after the mails were made up, the land journey to the outports was saved, and the mails conveyed to their destination in less time, and with more certainty than could be done by steam-vessels from any other point of the coast.—But as soon as a railway communication is established with Harwich and Yarmouth, all this advantage will be lost to the Thames.—The damage which steam has done to these ports as packet-stations the same mighty power will yet be the means of amply repairing. By sending off the mails by the railway to Harwich and Yarmouth as soon as made up, which is, not later than twelve o'clock at night, they will reach these ports by the same hour of the morning at which they now leave the Thames; one half the voyage will be saved; and an entire day, and often much more, gained in the course of transit. And thus, in the same way that the modern steam-vessels supplanted the old sailing-packets, may we surely reckon on seeing the steam-carriages of the Eastern Counties Railway restoring to its former course the passenger-traffic and commercial correspondence, between the British metropolis and the whole of the north of Europe.

The Directors beg, in conclusion, to assure the shareholders that the same spirit of determination which has enabled them to overcome the numerous difficulties which stood in the way of their obtaining the Act for the Incorporation of the Company, will continue in full vigor till every obstacle to the execution of the trust reposed in them has been overcome. Immediately on the Act being obtained, they directed all the necessary measures to be taken for enabling the engineer to commence operations with the least possible delay at both ends of the line, in order that the two portions of it likely to be the most productive,—namely, the London and Romford, and the Norwich and Yarmouth,—might be the soonest completed and opened; and negotiations for the purchase of the houses and lands required, are already in an advanced state. The expenditure on these parts of the line will be heavier than on any other; but in consequence of the considerable balance of the deposits left in hand, it has not been found necessary to make in the first instance a larger call than 1*l.* per share; and as the Directors have no doubt that this call will be responded to with cordial unanimity, the works will be in full progress before any further call is made on the shareholders.

Since the Act was passed, two vacancies have occurred in the list of gentlemen therein nominated, to constitute for a limited time the first Board of Directors; one by the lamented death of Mr. Crawford, and the other, by the resignation of Mr. Tite, who has since, with much advantage to the interests of the Company, been appointed its surveyor. The Liverpool shareholders, who now hold one-third of the entire stock of the Company, having at a late public meeting expressed a strong desire that they should be represented in the Board by two or more of their number, the Directors, considering this desire to be no more than just and reasonable, have, in virtue of the powers given them by the Act, elected two of the largest shareholders in Liverpool,—namely, Lawrence Heyworth, Esq., and Richard Hall, Esq.,—to succeed Mr. Crawford and Mr. Tite. In thus obeying the voice of the large and respectable portion of their constituency who are resident in Liverpool, the Directors are happy to state that they have at the same time added to their body, two gentlemen whose assiduous habits of business and intimate acquaintance with railway matters, are like to render their accession to the direction of the greatest advantage to the interests of the Company.

It may be proper to add, that by the Act of Parliament a certain fee is authorised to be taken on each certificate of registry and each transfer of shares; but that the Directors, considering that the levying of such a fee would impose an unnecessary tax on the shareholders—in the first stages, particularly, of the undertaking—have ordered that it shall not be enforced.

Signed, on behalf of the Directors,
HENRY BOSANQUET, Chairman,
R. J. HARVEY, Deputy Chairman.
18 Austin Friars, Sept. 26, 1836.

From the London Mechanics' Magazine.

MANUMOTIVE-CARRIAGES.

We have often wondered that in these inventive days, no one has perfected an apparatus similar in design to the one inquired for in the following communication—Cannot our ingenuity supply this trantsatlantic want?

SIR,—By the extract in your last number from a Dublin paper, we learn that a whitesmith of Enniscorthy is emyloyed, as several other persons at this time are, in constructing a manumotive-carriage. In the present instance the vehicle "is propelled by an iron handle, which the guide moves to and fro with the right hand."

One would think it was almost impossible to hit upon any scheme for this purpose possessing much novelty, so many and so various are the plans that have been tried. When *velocipedes* were so much the rage in London a few years since, much ingenuity was exercised to produce manumotive-carriages in which the softer sex might ride; but without success, and since that time this has been the favorite hobby of many individuals. It is unfortunately a fact, that too many persons are apt to imagine, that the success of their machine depends upon the quantity and complexity of the mechanism employed, and this mistake generally proves fatal to their success.

When discussing this matter in a previous number (635,) I stated that the simplest, and therefore of necessity the best way of constructing manumotive-carriages, was to "fix a spur-wheel on the axle of the propelling-wheels, and drive them by a pinion duly proportioned to the inverse quantities of time and power. The man's labor applied tothe pinion by means of a winch-handle, would produce all the effect to be derived from such a source, and more than could possibly be obtained by any more complicated train of mechanism."

By applying the manual power to two cranks placed on the axle of the pinion, but opposite to each other, working the one with the right hand and the other with the left, the greatest possible effect would be produced. The guiding could easily be managed with the feet. By a machine so formed, favored with all the advantages of the best workmanship, a person might propel himself at a tolerable good speed; but for any great distance, I apprehend it might be walked over in about the same time with less bodily exertion, and therefore with greater ease.

There are cases, however, where persons have not the free use of their legs, while thier arms retain all their wonted vigor; to such parties a machine of this kind would be of infinite service. It is desirable, therefore, to put those persons in the right road who are wishing to construct such a machine.

In the case of Mr. Nicholson, he appears to be adopting the plan, familiar to the inhabitants of this metropolis, from its having been frequently seen in our streets; a carriage was constructed, and propelled at the rate of five or six miles an hour by six men, who each pulled a lever "*to and fro*" with a motion very similar to rowing, which acting upon cranks placed on the axle of the driving-wheels, turned them round and thereby urged the carriage forward. The conversion of rectilinear into circular motion, in this case, is attended with a great waste of power, and the plan I have pointed out would in practice be found more convenient as wellas much more efficient.

There are cases, as I have already stated, in which manumotive vehicles would prove eminently useful; in general, however, to persons in full possession of all their natural powers, the *marrowbone* stage will be the best conveyance.

Yours respectfully,
WM. BADDELEY.
LONDON, Oct. 4, 1836.

The Military road from St. Peters, near the Falls of St. Anthony on the Upper Mississippi, and along the Western Fron-

tiers of Missouri and Arkansas to Red River, is about to be commenced, under the direction of some distinguished officers of the Engineer Corps.

From the Journal of the Franklin Institute.

SPECIFICATION OF A PATENT FOR AN IMPROVED BOILER FOR GENERATING STEAM, GRANTED TO JOHN AMES, SPRINGFIELD, HAMPDEN COUNTY, MASSACHUSETTS, MARCH 12TH, 1836.

To all whom it may concern, be it kown, that I, John Ames, of Springfield, in the county of Hampden, and State of Massachusetts, have invented an improved boiler for the generating of steam, to be used in the drying of paper, and for other purposes, and do hereby declare that the following is a full and exact description thereof.

As this boiler is not intended to be used for steam of great elasticity, but is designed mainly, to produce it in large quantity, I intend, usually, to make it of cast-iron, although wrought iron or other metal, may be used if preferred. It may be made of various sizes, and in different shapes, but for the sake of description, I will give the dimensions of one which I have tried, and found to answer well. It consists of a box four feet square, and two feet deep, the two sides being open, but furnished with flanches for the purpose of bolting on the two plates which are to form the two sides of the stove. Tubes, forming flues, in the manner of the boilers now in general use for locomotive engines, are to pass through these side plates. In the one alluded to, the plates are cast with six rows of holes, nine in each, and about two inches in diameter. The upper row of tubes must be sufficiently below the water-line to ensure their being constantly covered; and above the water there must, of course, be sufficient space to form a steam chamber, or reservoir.

When this boiler is set, the draught from the fire place below it passes through two rows of the tubes, is returned through the next two, and finally through the upper rows. The manner of forming the flue by divisions, extending from the brick work te the sides of the boiler, between the respective pairs of rows will be readily understood by reference to the drawing which accompanies this specification.

Fig. 1.

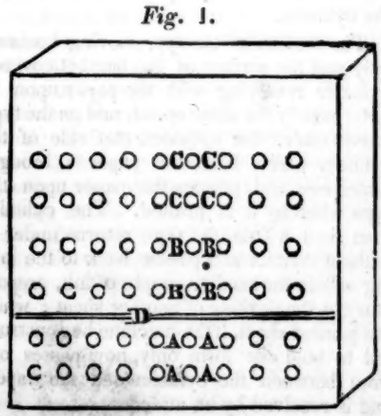

Fig. 1. is a side view of the boiler A A B B., and C C, being the open end of the tubes through which the heated air from the furnace is to pass, as will be shown more distinctly in fig. 2. D, is one of the ledges or partitions which project out from the boiler, occupying the space between it and the masonry in which the boiler is set, and causing the draught to enter the tubes A A. in order to its returning through those marked B B.

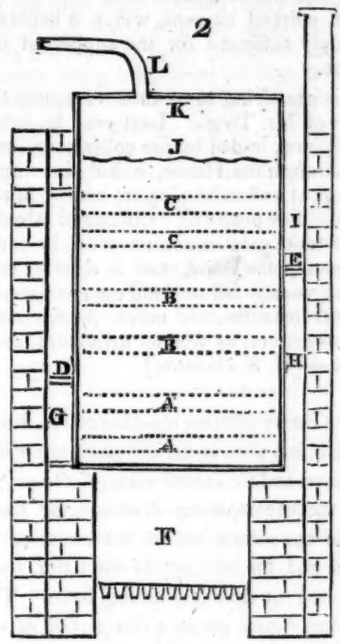

Fig. 2. is a vertical section of the boiler and furnace, cutting the boiler from front to back. A A, B B, and C C, are the double ranges of tubes, as in fig. 1, represented by dotted lines D and E, are partitions which direct the draught through the tubes in the following manner. Let F. represent the furnace, and C, a part of the flue into which the tubes A A, open, the draught being arrested by the partition D, will pass through A A, into the flue H, and being arrested by the partition E, will return through the tubes B B, then pass those marked C C, into the flue I, leading into a smoke pipe, or chimney; J, may represent the water line, K, the steam chamber, and L, the steam pipe.

Although I kave mentioned a certain number of tubes, and have said that in the boiler which I have tried, the heated air is made to pass through the water three several times, it is manifest that the same operation may be repeated as frequently as it shall be found advantageous so to do. The number of tubes also, may be varied, and they may be placed in single rows, or otherwise, without altering the principle of action.

I have not mentioned the safety valves, cock, or other general appendages to steam boilers, as in these I do not profess to have made any improvement; nor have I described any particular manner of securing the tubes, this being well known to engineers.

A boiler thus made, is recommended by its simplicity and economy, where it is desirable to generate a large quantity of steam under a moderate pressure, as for the purposes of heating and drying in various manufacturing processes. What I claim as my invention in it, is the general combination and arrangement of the parts by which the draught from the fire is made to pass repeatedly through the water, as herein set forth, whether made in the exact form represented, or any other which is substantially the same in its construction and operation.

JOHN AMES.

From the London Mechanics' Magazine.

TUNNEL UNDER THE NIAGARA.

SIR,—I perceive in some former Number of your Magazine, you have related an account of a proposed tunnel under the Ohio river at Cincinnati; your correspondent does not state that the bed of the river there, is a limestone rock, and the huge building of immense thickness, and nine or eleven stories high in the water, stands on the rock, and all the stone to build it was procured from the bed of the river at low water. However, I am not going to relate any thing of the difficulties of that affair; my business is to suggest to your readers, and all others whom it may concern, that the greatest, best, and most magnificent tunnel in the world, would be in Canada, under the river Niagara, at the rapids of Fort Erie, opposite Buffalo in the United States; I say the best, and the easiest made, for the Niagara river there is narrowest, and its bottom is a flat, hard rock, which is a natural shield of itself, and below it a softer rock, which is easily cut. Captain B. Hall, in his "Travels" in America, has particularly described the strata a little lower down at the falls.

Now, if Brother Jonathan would agree to meet us half way, the thing, though of so great magnitude, would be easier performed than any thing of the kind in any other part of the world. The only attention required would be to plug up with clay any fissures in the rock which might occur, and cement them over. No great depth is required; the water seems as shallow there as at the falls on the same rock. All Lake Erie is on a complete bed of rock, and so level that an anchor slides along hundreds of yards at a time without holding. The whole is particularly suitable for such a purpose; and whenever done (if ever done,) your publication will have the honor of first pointing out to the public its true nature.

Your constant well-wisher,

A TRAVELLER.

Wilden, Sept. 30, 1836.

Miscellaneous.

From the London Mechanics' Magazine.

ANOTHER DISCOVERER OF A MODE OF PROPELLING AND DIRECTING BALLOONS.

An Italian gentleman, Signor Leonardo Andervolti, of Spilinbergo, in the Friuli, informs us that he has invented an ærial locomotive balloon, capable of propulsion and direction at pleasure, with safety and precision, either with or against the wind. He has constructed, he says, a working model of this machine, with which he has actually traversed the air in his own country. He offers, if a certain sum of money be guaranteed to him in the event of his succeeding (of which he entertains no doubts,) to fly over to England in his balloon!—Or that he will at his own expense

construct a balloon here, which shall be able to keep up a regular traffic between any two points at a reasonable distance from each other, with even greater rapidity than any steamboat or coach! The Signor does not ask a farthing until he has performed the foregoing conditions; but as his mechanism is so simple, that as soon as constructed it would be copied, and he might thereby lose the fruits of his ingenuity, he requires that a certain sum should be guarateed him before doing so, either by a company or individuals, to whom he would assign his invention secured by patent. Signor Andervolti has left his address at our office.

The Signor speaks very fair; and as he asks nothing until he fulfils the conditions above stated, there could be no risk incurred were a number of individuals to subscribe for a hundred pounds or so each to secure so grand an invention. Of the thing itself we do not profess to give an opinion,—we know no more of it than what is stated above.

PENNSYLVANIA COLLEGE OF MINES.

We perceive that on Tuesday, Mr. Trego, one of our city delegation, gave notice in the House of Representatives, that he should next day ask leave to bring in a bill entitled "An Act for the Establishment of a College of Mines in the State of Pennsylvania."

It is understood that this bill will provide for the erection of an institution in which, in connexion with other useful and practical sciences, will be taught:

1. Geology, Mineralogy and Chemistry, as applicable to agriculture, architecture, the construction of canals and roads, the digging and boring for water, &c.

2. Mineralogical Chemistry, exemplifying theoretically and practically the most approved and economical methods of analyzing ores, earths, soils, mineral waters, &c.

3. The theory and practice of Mining, with reference to the geographical and geological position of the mineral beds and veins, and the discovery and discrimination of minerals in rocks and soils; also, the practice of engineering, as applied to mining.

4. Metallurgy, theoretical and practical or the art of reducing and smelting ores, and of separating them from foreign matter as well as from one another; also, the mode of making the best combinations and alloys of metals used in the arts.

It is also intended to establish in the said college, a collection of specimens of all the important rock, formations and of all the minerals found in the State, properly and scientifically arranged, with their names and localities; and also a description of their chemical character, composition and their use in the arts. Also a similar collection of all useful or curious foreign minerals, with their names, uses, &c., together with such information relative to them as will be calculated to lead to their discovery in the State of Pennsylvania.

Instead of an endowment to this college from the State treasury, it is proposed to appropriate, in aid of its funds, the State tax on the dividends of coal and mining companies, and companies for the manufacture of iron, incorporated within this commonwealth which, with the aid of subscriptions and donations from liberal and public spirited citizens, will, it is believed, be amply sufficient for the support of the college.

It is gratifying to us thus to notice the labors of Mr. Trego. Last year he introduced, and, aided by his colleagues, carried through the House, a bill directing a geological and mineralogical survey of the State. The proposed "College of Mines" seems to be most consonant with the capabilities of our State, and if rightly conducted, cannot fail to bring out its immense mineral treasures, and make them contribute to general as well as individual prosperity.—[U. S. Gazette.]

The rotary printing machine of Mr. Rowland Hill has already excited much attention. We have had the specification of the patent with the accompaning drawings for some time in our possession, but the length of the former and the intricacy of the latter, have prevented us from publishing them. The following article giving a description of the machine is from the Repertory of Patent Inventions, and will be found to convey a very correct notion of the machine without reference to details.

THE ROTARY PRINTING MACHINE BY MR. ROWLAND HILL.

The steam-printing press was introduced at the close of the year 1814, before which time all printing was done by hand-presses, and the rate at which large sheets as newspapers were printed, scarcely ever exceeded 300 single impressions* in an hour.

The insufficiency of the hand-press to meet the growing demands of the public for newspapers was probably felt at a much earlier time, as in the year 1790, Mr. William Nicholson, editor of the journal bearing his name, obtained a patent for machines for printing upon various plans, and it is certainly the case that he then *indicated* very many of the modes of operation which, since his time, have been successfully developed by other machinists. Mr. Nicholson appears never to have carried out any of his plans to a successful termination. Whether he was unable to work out the numerous mechanical details, or wanted funds to meet the heavy and unavoidable expense of such undertakings, or could not induce those engaged in the trade to give his plans a fair trial, we have no means of ascertaining; certain it is, that whether succeeding machinists have or have not been indebted to him for their leading views, they have had still to encounter by far the most difficult part of their task, and in overcoming the various physical and mechanical difficulties which lay in their way their powers of invention and their patience and industry must have been exercised in no ordinary degree.

* Impressions on one side only of the sheet of paper.

When, however, the machine-presses were brought into action a great increase of speed was at once obtained.

During the twenty-one years which have elapsed since their introduction, various and important improvements have been effected in their construction, and by the rapid and powerful machines now used in printing the daily newspapers, the surprising number of 4000 single impressions is sometimes given off in an hour.

The inventor of the machine, which is the subject of this paper, believes that he has effected improvements by which the rate of printing just named, great as it is, may be still further increased, and that in no trifling degree.

In order to explain the means by which this advantage is proposed to be obtained, it is necessary to notice slowly the construction of the machines now commonly in use.

The type necessary to the printing of one side of the sheet, consisting (for a newspaper,) of about 100,000 separate pieces, are collected, and being arranged in proper columns, the mass is placed in an iron frame called a chase, which binds it firmly together, and the *form* (as the chase filled with type is technically called) is then transferred to the machine, where it is secured upon a strong iron plate, which plate being mounted upon truck wheels, forms a carriage; and there is a small railroad for it to run upon.

When the machine is in action this carriage, with the form upon it, of which the face* of the type constitutes the upper surface, is constantly moved backward and forward horizontaly, and as it passes along, it comes in contact, first, with the inking apparatus, which consists principally of a number of cylindrical rollers covered with ink and lying horizontally, and which are set in motion by the friction of the surface of the type acting upon their lower sides as it runs under them.

Next the *form*, being now inked, passes under a large revolving iron cylinder about the form and size of an ordinary double drum; this lies horizontally, and its curved surface is covered by a closely wove blanket bound tightly upon it.

The paper as it is supplied to the machine, is made partly to encircle this cylinder, being held against it by tapes which move with the cylinder.

The surface of the type moving horizontally and the surface of the blanket-covered cylinder revolving with the paper upon it, have exactly the same speed, and as the type passes under the cylinder, that side of the cylinder which bears the paper is brought undermost and presses the paper upon the type whereby it is printed. The cylinder then rises a little, the type returns under it without contact and passes back to the inking rollers for another supply of ink, preparatory to the printing of another sheet; while the printed sheet, if the machine be constructed to hold one form only, now passes out from between the cylinder and the tapes, and is received by an attendant.

Simple and ingenious as this arrangement undoubtedly is, the experienced machinist will at once perceive that it has points in

* That part which gives the impression.

which improvement is at least highly desirable.

That which is most objectionable is the reciprocating motion of the form and its carriage, which together are of considerable weight, varying perhaps from five cwt. to a ton, and it is obviously difficult, if not impossible, to keep such a heavy mass in very rapid motion when the direction of that motion has to be reversed every instant.

Also much time is occupied by the backward motion of the *form* by which the type obtains a supply of ink, and regains the position proper for the printing of a succeeding sheet.

And the rate of reciprocating motion really obtained, though not great, requires much power to produce it.

These defects appear to be unavoidable while the type forms a flat surface, as it is not practicable to make a flat surface move continuously.

Mr. Hill proposes to obviate these defects by affixing the type around a cylinder so that the surface of the type itself shall form a kind of outer cylinder, the whole resembling slightly an organ barrel with its projecting pins; and he has certainly overcome the principal difficulty as it appears, viz., the discovery of a mode of readily and securely attaching the pieces of type to the cylinder, and this without making it difficult to detach them for the purposes of correction, revisal, &c. Of the manner in which this is accomplished we shall speak presently.

The type so affixed upon a cylinder, together with the proper spaces for margin, occupy its whole circumference; the cylinder thus clothed is placed in contact with a blanket-covered cylinder of the same dimensions, and the two are connected by toothed wheels, and the paper is passed between them with moderate compression, just as a piece of metal is passed between the rolls of a flatting mill. An inking apparatus is attached by which a constant supply of ink is communicated to the type as it revolves.

As the type cylinder has affixed to it precisely the quantity of type requisite for printing a sheet on one side; and as there is no vacant space upon the cylinder except for the margins, it follows that at each revolution of the cylinder exactly one sheet will be printed; and that the instant the printing of one sheet is completed, that of another will be commenced; no loss of time therefore can occur if the supply of paper and of ink be kept up.

Again the motion being rotatory, not reciprocating, there is no difficulty in making it rapid; and the machine has been repeatedly worked with great rapidity in the presence of numbers of persons, without injuring or disturbing any of its parts, and without deteriorating the quality of the printing.

In the machine which has been exhibited, there are two type* cylinders and two blanket cylinders placed thus  : the paper in passing from left to right between the first rollers is printed upon its upper side, and in passing between the last rollers it has its lower side printed.

* One only has been covered with moveable type, the other has stereotype plates bound round it as a temporary arrangement.

This arrangement, of course, requires two distinct inking apparatus, one for each type roller.

To supply the machine with paper in single sheets at the rate of two per second, at which rate the machine has hitherto been worked, would be difficult if not impracticable; the plan therefore has been to make use of a long scroll of paper as it is produced by the ordinary paper machines, the end of which being introduced between the rollers the machine then supplies itself by unwinding the scroll from a reel.

It is intended to cut the scroll up into single sheets by additional machinery, as it passes from the printing rollers.

The greatest difficulty which Mr. Hill has had to surmount in the construction of his machine, is, as we have already stated, that of fastening the small pieces of type upon the surface of a cylinder, and with firmness to ten columns upon one side of a newspaper*; each tray being filled with type has a proof taken from it by a small press, and, after correction, the type being made fast by tightening the horizontal screws with which the galley is provided, the galley itself is screwed upon the cylinder. When the ten galleys are so attached to the cylinder, they cover it completely, excepting the spaces left for margin, but any one galley can be easily removed and replaced without disturbing any other.

The galleys filled with type being firmly screwed to the cylinder, thenceforward form part of it, and are not removed until the printing is completed and the type is to be taken out for distribution, unless it should become necessary to stop the press for further revisal or the insertion of new matter.

The very rapid supply of ink which the machine demands, by reason of its great speed, appears to be fully maintained, and that with very good color, by the inking apparatus attached.

Mr. Hill employs the trough (for containing the ink,) with its ductor-blade and iron roller, having proper screws for increasing or diminishing the space between the blade and the roller, through which space a thin film of ink adhering to the surface of the roller passes from the trough as the roller revolves.

This ductor is in every respect of the usual construction; its roller turns very slowly; next to it Mr. Hill places another iron roller lying parallel with it and just touching it, but having a rapid motion equal to that of the surface of the type, and this roller by gently but swiftly rubbing against the ductor-roller, takes off its ink in a much thinner and more extended film. It ordinarily moves about eighteen times as fast as the ductor-roller, therefore it ordinarily extends the film of ink brought out by the slow-moving ductor-roller over eighteen times the amount of surface it first occupied.

Means are provided by which the relative speed of the ductor can be readily increased or diminished, and thus a very nice adjustment of the quantity of ink supplied to the type can be effected.

We have spoken incidentally of the great speed of Mr. Hill's machine; being worked by two men it throws off sheets of the size of the evening newspapers, at the rate of 7000 retain their places even when they are turned upside downwards by the revolution of the cylinder, at which time their gravity combines with their centrifugal force in tending to displace them, and to effect this without throwing new difficulties in the way of correction, revisal, &c. We shall endeavor to explain how this is accomplished.

Each piece of type is slightly wedge-like in its form, so that when several are laid side by side, they form a segment or arch whose lower curve corresponds to the surface of the cylinder upon which the type is to be fixed,* and each piece, instead of the ordinary narrow notches in its side, made for the compositors convenience, has a very broad notch; when the type is placed together to form a line these broad notches in the several pieces range together, and form an arched chase capable of receiving a thin brass plate of corresponding form and dimensions, which, when applied, is wholly embedded in the chase. When a line of type with its plate, or scale-board, so embedded within its substance, is compressed between the lines, and its plate thereby completely inclosed and kept in its place, it is manifest that no single piece of type can be displaced: if any move the whole line must move. Means have been adopted, which we have not space to describe, by which these plates are made to take their places in the course of the composition, with the utmost readiness and certainty.

The lines of type are placed in a kind of tray or galley, of the length and breadth of a newspaper column; the bottom of which tray is a portion of a cylinder, the curvature being in its breadth, not in its length, somewhat as though a stave were taken from a truly cylindrical cask, and used as the bottom of a tray, the curved side being uppermost. The lines of type are secured in the tray principally by horizontal screw pressure acting against the ends of the column of type; but as a precaution against a tendency to bulge, which sometimes occurs in a column of the great length required in a newspaper, a few of the embedded plates have small projecting tenons at their ends, which lock into certain chases in the sides of the tray just described.

The upper type-cylinder of the machine exhibited has ten such trays answering to the to 8000 perfected copies per hour. What rate can be safely given to it by the application of steam power it is difficult to determine. At the speed above named, a scroll of paper of the width of a newspaper, and from three miles and a half to four miles long, might be printed on both sides in one hour.

Before the introduction of printing-machines in 1814, the printers of large newspapers, confined in their operations by the slowness of the hand press, had no resource, under the pressure of urgent demand, but to set up a portion of their matter in duplicate, at an expense of some thousands per annum. It seems not improbable that the expected abatement or removal of the stamp duty may soon cause the demand for newspapers to

* The lower type-cylinder, which prints the other side of the paper, is temporarily covered with stereotype plates, as before named.

* Mr Nicholson proposed to use wedge-like type, and to affix them upon a cylinder, but he did not show any sufficient means of so affixing them.

overtask even the great power of the present machines.

Should such a pressure arise, and should Mr. Hill's machine prove as successful in extended practical operation, as the numerous experimental trials it has had give reason to expect, its introduction will probably bring relief in the same way as it was brought up by the introduction of the machines first used.

From the London Mechanics' Magazine.

MODE DISCOVERED OF PROPELLING BALLOONS IN ANY DIRECTION.

Sir,—It is really a matter of no small surprize, that, after all the investigations and experiments made in ærostation, since Albert first asserted, and Montgolfier afterwards demonstrated, the practicability of floating in the upper regions of the atmosphere, that balloons should remain to this day the same unwieldy and ungovernable toys as at first constructed.

After the first principle, or rather the first power of balloons—that of ascension, had been satisfactorily established, both by calculation and experiment, the next thing that became desirable was the power of propelling and guiding them at will.

Various attempts have at different times been made to accomplish this eminently desirable object; but being for the most part made without judgment, they were unattended with successful results. Sufficient has been done, however, to prove beyond all question, *that propellers will act upon a balloon*, with an effect proportionate to their size, and to the manner in which they are placed and worked. It is also equally evident, that so soon as æronauts can, by any means, cause their balloon to move with a velocity differing from that of the current of air in which they are floating, a rudder will become efficient, and the balloon will answer to the helm.

People frequently confuse themselves in their application of the simple principles of navigation in a denser medium *to ærial navigation.*

So long as a boat, barge, &c. moves with the same velocity as the stream, a rudder is wholly useless; but, if the boat or barge is made to move with a different velocity—i. e. *either faster or slower* than the stream—the rudder becomes an efficient agent in directing the movements of the vessel. With balloons, precisely the same law obtains; the moment they can be propelled, they will become capable of being guided.

In a recent Number of your Magazine, Mr. Mackintosh very justly observed, with respect to the difficulty of propulsion, that "the difficulty consists simply in this:—The resistance is greater than any power that has been hitherto applied to overcome it." He further adds, "to meet this difficulty we must *increase the power*, and *decrease the resistance.*"

Mr. Mackintosh's reasoning upon this subject is perfectly correct; and I have now to state, that following out precisely the same principle, I have succeeded in contriving a balloon of entirely new description, possessing all the requisities for efficient ærial navigation, and capable of being propelled and guided at the pleasure of the æronauts. The few scientifie friends to whom I have submitted my plans, have expressed themselves perfectly convinced of their feasibility, and feel satisfied that the time has now arrived when balloons will cease to be scientific toys, and assume a new and useful character.

It would not be consistent with my own personal interest, at this time, to develope the nature of my invention, but your readers will hereafter have an opportunity of becoming acquainted with it. I should wish no person to suppose for one moment that balloons will ever be guided in the teeth of opposing currents; but I am now prepared to assert, and all who have examined my scheme will support my position—that in balloons upon my construction, the power is so much increased and the resistance so much diminished, as to enable them to be propelled and guided through the air with as much facility as boats at present are upon the surface of our river Thames.

By the same means, an upward or downward direction can be given to a balloon, without in any way varying the quantity of gas or of ballast—and the machine brought under a degree of control hardly before anticipated.

I remain, Sir, yours respectfully,

WM. BADDELEY.

Oct. 11, 1836.

From the Repertory of Patent Inventions.

SPECIFICATION OF THE PATENT GRANTED TO FRANCIS BREWIN, OF THE OLD KENT ROAD, IN THE COUNTY OF SURREY, TANNER, FOR CERTAIN NEW AND IMPROVED PROCESSES OF TANNING.—SEALED JANUARY 11, 1836.

To all to whom these presents shall come, &c. &c. *Now know ye*, that in compliance with the said proviso, I, the said Francis Brewin, do hereby declare that the nature of my said invention, consists in the making or preparing a new liquor or liquors for tanning or manufacturing raw hides and skins into leather, and for retanning leather manufactured in the ordinary way from certain exotic substances, which have not heretofore been in use for manufacturing leather in this country, or from a combination of these substances with other materials already in common use, by means of which new liquor or liquors, leather can be manufactured of a superior quality in less time than usual, and at much less expense, and by which also leather manufactured in the ordinary way may be improved in quality. And I declare that the manner in which the said invention is to be performed, is fully shown and set forth in the following description thereof, (that is to say):

I employ in the making and preparing of the said new tanning and retanning liquor or liquors, certain substances known in English commerce by the names of gum-kino, divi-divi, and terra-japonica, all of which I find contain much larger proportions of tannen than the best English oak bark, and yield liquors, possessed respectively of the following properties:—a solution of gum-kino imparts to leather a brownish red color, but improves it considerably in point of closeness and firmness of texture; a solution of divi-divi gives a very light color to leather; a solution of terra-japonica, of the sort generally imported in small square pieces, gives a dull light color, and one of terra-japonica of the sort generally imported in large cakes, a brownish red similar to that obtained from gum-kino. A solution of divi-divi I prepare in the same way as the ordinary bark liquors are made in vats or lecks by tanners.—But gum-kino and terra-japonica require to be treated in the manner following. I the gum-kino is in large pieces, or if the terra-japonica is of the sort which is sold in large cakes, I first break these large pieces and cakes with a hammer into small pieces; I then steep the whole for about three days in cold water, or cold weak tan liquor; after which I put the whole into what I call a rubbing tub of the construction shown in the drawing in the margin hereof, for the purpose of being still further reduced; or I use hot water, or hot weak tan liquor, in which case I put the whole of the materials at once into the rubbing tub, and leave them to steep for about an hour only, which last process is that which I prefer. This tub is about five feet deep and four feet wide in every part, and has a loose cover just so much smaller to it in circumference that when not kept up by the materials in the tub, it will readily fall to the projection or stopper, fixed at about four inches from the bottom, and in this cover, on the under part thereof, about one hundred spikes of copper, wood, or any other material that will not stain the liquor, of about three inches long, are firmly inserted. A square wooden shaft, about five inches thick, with a wheel or handle at top to turn it by, is passed through an orifice of corresponding size and description in the centre of the cover, and drops into a recess in the bottom of the tub, large enough to allow the shaft to turn freely within it. The materials having stood sufficiently long for steeping, the shaft of the tub is worked round by manual or other power, which carries around with it the loose cover with the spikes underneath, till, by the stirring and rubbing action of the spikes, the pieces of the gum-kino or terra-japonica in the tub, are either successively dissolved or reduced to such small dimensions as to pass easily between the cover and the sides of the tub; and in order that the said cover may press continually downwards on the materials in the tub, and descend as the materials become dissolved or reduced to the dimensions aforesaid, a heavy weight or weights is or are placed and kept on the top thereof during the whole of the operation: and in preparing the said solutions for use I employ more or less water or weak tan liquor, according to the sort of leather which is intended to be manufactured; (that is to say,) for sole leather I use about fifty to one hundred pounds of the gum-kino, or of the divi-divi, or of the terra-japonica, with about one hundred gallons of water or weak tan liquor; and for manufacturing dressing leather, I use with every fifty to one hundred pounds of the divi-divi and light terra-japonica about three hundred gallons of water or weak tan liquor, rarely using the

gun-kino or dark terra-japonica at all in the manufacture of dressing leather, or any sort of leather in respect to which color is an object; or instead of at once dissolving the said materials in the said proportional qualities of water or tan liquor, I dissolve them at first in any smaller quantities of water or weak tan liquor, and afterwards reduce the solutions to the required strength by the addition of water or weak tanning liquor; and when I have, by the processes aforesaid, obtained the requisite solutions of gum-kino, divi-divi, light terra-japonica, and dark terra-japonica, I generally mix for sole leather the different solutions together in a common tan vat in the following proportions; (that is to say,) one quarter of the solution of gum-kino, one quarter of the solution of divi-divi, one-eighth of the solution of the dark terra-japonica, and three-eighths of the solution of the light colored terra-japonica; I then put into the liquor so prepared and compounded, about one-fourth more raw hides or skins than would in general be put by tanners, into an equal quantity of bark liquor, and with every hide I put on an average about one pound of oak bark in the same way as tanners now use bark in the vats with hides and skins. For manufacturing dressing leather, I mix the solutions of divi-divi and light terra-japonica, prepared as before mentioned, and put the hides or skins into them with the same proportions of bark and liquor as are hereinbefore directed to be used in the case of sole leather. When the leather is required to be of a very close and firm texture, and the color is a matter comparatively unimportant, I make use of a larger proportion of the liquor of gum-kino than is before directed. and when the dark terra-japonica is low in price, and when the color to be given to the articles is immaterial, I also make use of a larger quantity of that material than of any of the others; and when it is desired to have the leather of a color lighter than that which results from the combinations of all the four liquors in the proportions before recommended, I diminish the proportional quantities of the dark coloring substances according to the particular shade of color required to be given to the article. And whereas some one or more of the said articles may occasionally be so scarce in the market, or so high in price that it may not be practicable or economical to employ it or them in the quantities before recommended with the other substances, I declare that the use of any one or more of the said substances may be dispensed with either wholly or partially, but subject to the following modifications in the effects produced; (that is to say,) if gum-kino be used alone the leather produced will be too hard and close for general purposes; if divi-divi be used alone, it will produce leather lighter in color than usual; if terra-japonica be used alone, an article will be produced possessed neither of that firmness nor that color which is generally desirable in leather, while, by the addition of divi-divi to gum-kino or terra-japonica, a better article is produced than can be obtained from either gum-kino or terra-japonica separately. And whereas also the prices of all the four articles aforesaid may, at times, rise so high that, notwithstanding their superior tanning properties, they cannot with economy be entirely substituted for oak bark, or any of the other barks or tanning materials now in common use, I declare that the same may be advantageously used in combination with the said common materials in the proportions following; (that is to say,) any given quantity of gum-kino, divi-divi, and terra-japonica, mixed in the proportions before recommended, may be combined with any quantity of oak bark; or any given quantity composed of six-twelfth parts of light terra-japonica, four-twelfth parts of divi-divi, and two-twelfth parts of gum-kino may be combined with an equal quantity of mimosa bark or kermac root; or any given quantity composed of gum-kino, divi-divi, and terra-japonica, in equal proportions, may be combined with two-eighth parts of valonia, and two-eighth parts of oak bark; or, lastly, eight parts of gum-kino, divi-divi, and terra-japonica may be combined with two-eighth parts of oak bark, and one-eighth part of shumach. When gum-kino, or divi-divi, or terra-japonica, or any of them, are intended to be used along with oak or other bark, they may either be ground very small in a common bark mill, after being well dried, if not sufficiently dry for grinding in their original state, and then mixed up with the bark, or the bark and divi-divi may be steeped by themselves in the taps, and the liquor drawn off and made hot, and then put in such quantity into the rubbing tub as is necessary to dissolve the gum-kino or terra-japonica, as before described, which latter method is that which I prefer; or water or weak tan liquor alone, either hot or cold, may be used to dissolve the new materials before mixing them with the common liquors; the liquors made from these various articles I prefer using of about the same tanning strength as those made from the new materials alone; and though the proportions in which I have hereinbefore directed the gum-kino, divi-divi, and terra-japonica to be mixed with each other, or with oak bark and others of the materials already in common use, are those which I have found to answer best under ordinary circumstances, I declare that the said proportions may be varied at the discretion of the practical tanner according as the taste of customers in respect to the color of leather may vary, or according to any particular quality desired to be given to the manufactured article, or according to the comparative cost at different times of the different materials. And I declare that for retanning or improving leather made in the ordinary way, I put it into a fresh liquor, the same as is hereinbefore directed to be used for sole leather, and after it has remained therein for one day, I handle it, I then allow it to remain in the liquor for from eight to fourteen days, after which I take it out and dry it, and, if necessary, restrike it; and I declare that what I claim as my invention is the making and preparing of a tanning liquor or liquors for tanning or for manufacturing raw hides and skins into leather, and for retanning leather manufactured in the ordinary way with gum-kino, divi-divi, and terra-japonica, either employed separately or combined with each other, or with other substances already in common use, in the different proportions, and in the manner hereinbefore specified, or in any other proportions and manner which a change of circumstances may render more suitable; and such my invention being, to the best of my knowledge and belief, never heretofore used in this country, I do hereby declare this to be my specification of the same, and that I do verily believe this my said specification doth comply in all respects fully and without reserve and disguise with the proviso in the said hereinbefore in part recited letters patent oontained; whereof I hereby claim to maintain exclusive right and privilege to my said invention.—In witness whereof, &c.

Enrolled July 11, 1836.

From the London Mechanics' Magazine.

ON AEROSTATION.

Sir,—Having in my letter of the 1st ult. (see p. 307,) endeavored to show the improbability of aerial machines tending to any useful purpose, while they retain their present form, I shall now add a few remarks, suggesting the form in which balloons ought, in my opinion, to be made.

In art we generally imitate the works of nature; now, all animated bodies intended for locomotion in the air or water have a head and a tail; man has imitated this in the ship, which has a stem and stern; but in the balloon he has neglected his model, as at present made they have neither, and to this mal-confirmation alone must be attributed the repeated failures that have taken place in all attempts at guiding them. Upon this, I found the following observations:—

Balloons have two motions, a vertical and a horizontal; the former caused by the levity of the gas contained, and the latter by the prevailing current of air in which it ranges; and this latter is the movement that requires to be regulated, as the other can be varied by retaining or discharging of the gas or the ballast. Now, when it is considered how readily a vessel answers to her helm, and that water is to air, as 832 to 1, I cannot conceive that it would be found so difficult a task to guide an *oblong machine* in such a yielding element as atmospheric air. I am aware that many scientific persons think differently; I would call the attention of such to an account in the daily papers, not many months ago, of one of his Majesty's ships, after losing her rudder and a temporary one in a hard gale of wind of several days' duration, having been steered up the Channel to Spithead by only attending to the trimming of her sails; there are also other known modes of steering by the assistance of the wind alone. In short I am doubtful whether machines to float in the air should differ, except in the *materials* for their construction, from those used to float on the water.*

It is common with with aeronauts now to ascend to a most unnecessary height for any experimental purpose; if ascensions were confined to a moderate height,

sufficient for all the ordinary] purposes of voyaging, descents might generally be more safely and rapidly effected in cases of danger. With respect also to the proposed enlargement of balloons, I would ask, are not two or three persons sufficient for philosophical or experimental trials? First let the aeronauts show the capability of guiding them, and capaciousness may then follow. When announcements like those of the proprietor of the "Eagle" and her seventeen passengers are made, I augur unfavorably of their performances adding much to our stock of knowledge. Proofs of the points necessary to be first ascertained might be made for a tithe of the money that must be expended in making a balloon of the magnitude of that now about to ascend from Vauxhall; for the fate of which all thinking persons must feel some apprehensions, notwithstanding its being under the guidance of the most experienced aeronaut of the day.

I remain, Sir, yours, &c.

OMRI.

London, Sept. 4, 1836.

*In comparing aerial with marine navigation, the fact is generally lost sight of, (as in the present instance by "Omri,") that in the latter case the vessel floats in one medium and is propelled by the help of another, whilst in the former it floats in, and is propelled by, one and the same medium.

From the Athenæum.

MEDALLIC ENGRAVING.

The idea of employing machinery for the purpose of engraving upon metals is not of very recent origin: as was the case with steam navigation, the principle was recognized many years before it was put into successful practice. In the year 1830, Mons. A. Collas, an able mechanician at Paris, having been commissioned by an engraver at Ghent to make a ruling machine for him, constructed one for himself, upon a somewhat different principle, with which he made several attempts to execute engravings upon copper, in the style of a pattern which had been published in the *Manuel des Tourneurs* upwards of twenty-four years before. It was not till six months' labor and thought had been bestowed upon it that M. Collas brought his invention to a certain degree of perfection: he produced his first engravings in the spring of 1831. Of the attempts at a similar instrument, made in the United States, we are informed, and believe, that he had seen or heard nothing; but in the year 1833 he chanced to meet at Paris with an old mathematician from Geneva, whose father had, some sixty years before, been employed in executing engravings by machinery upon the cases of gold and silver wathes; so that the remotest traces of this art may be dated about the year 1775 to 1780.

It has been ascertained, beyond all doubt, that this invention is not of domestic growth in England. It was in the year 1817 that a die-sinker of the name of Christian Gobrecht, then living at Philadelphia, produced by a machine an engraving upon copper of a medallic head of the Emperor Alexander of Russia, several impressions of which were distributed in that city. Mr. Asa Spencer (now of the firm Draper, Underwood, and Co.) took one of Gobrecht's machines with him to London in the year 1819, which was its first introduction into London. This machine was principally designed for straight and waved lines; it was employed in London, and its uses exhibited and explained by Mr. Spencer to several artists. It attracted the particular notice of the late Mr. Turrell, an engineer, and he obtained permission to make a drawing of the machine, for the purpose of having one constructed for his own use. Ten years afterwards, in the year 1829, Mr. Joseph Saxton, an American, born at Huntingdon, in Pennsylvania, who had known Gobercht, and seen the engraving from the Russian medal, contrived a machine somewhat similar in principle to the one brought to England by Mr. Spencer; in this he first introduced a *diagonal tracer*, for the purpose of correcting some of the defects which existed in the medallic engravings executed by Gobrecht's and Spencer's machines; these had all of them an unpleasant twist upwards. and an evident distortion of the features of the head. In the following year, an idea being started of applying this new method to the engraving of designs for bank notes, Mr. Spencer again bestowed considerable pains upon the improvement of his invention, without any success. Mr. Turrell, who was acquainted both with Spencer and with Saxton, communicated his drawing and his ideas upon the subject to Mr. Bawtry, who then held the situation of engraver to the Bank of England, and it was this gentleman who originally applied to Mr. Lacy to construct a machine of this description for him. Mr. Lacy was then, as Mr. Spencer had been, connected with the establishment of Messrs. Perking, Bacon, and Petch, bank note engravers in Fleet street, and was the person employed, in the year 1832, to execute the engraving from a medal representing the bust of our present King, which appeared in the frontispiece of the "Keepsake" for 1833. The contracting parties did not come to a satisfactory agreement, and the negotiation was broken off. It was probably that at time that Mr. Bawtry entered into communication with Mr. John Bate, of the Poultry, optician and maker of mathematical instruments to the Board of Admiralty. Mr. Saxton had been introduced to Mr. Bate shortly after his arrival in England, and had, we believe, given to the latter his first notion of such a machine by exhibiting to him an engraving upon glass, executed by it. During the succeeding interval, Mr. Saxton had continued to attempt the improvement of his diagonal tracer which, though some distortions were manifestly obviated by it, was still utterly unable to give the effect of light and shade when employed to engrave medals of very bold, or, rather, *steep* relief, and inevitably left blank spots in the engravings. Here the matter rested for awhile.

In the earlier part of the year 1832, the Messrs. Bate having been informed that Mr. Saxton had effected several improvements in his machine, had an interview with him, for the purpose of exchanging their ideas upon the subject. But a natural feeling of jealousy prevented either party from exhibiting to the other his machine; the Messrs. Bate stated, indeed, that they had succeeded in removing the distortions which existed in their earlier productions; Mr. Saxton, on the other hand, referred to his own invention, and declared himself capable of executing by his machine as much as they could do by theirs; finally agreeing to satisfy them of the truth of his assertions, by putting into their hands an engraving, in which all distortions should be avoided. This engraving was a head of Franklin, with a bust of Minerva copied from a gem or cameo. Upon examining it the Messrs. Bate, however, seemed to think that some distortions, though slight ones, still remained. It was then proposed that both parties should execute an engraving from a gem representing the head of Ariadne, an impression of which, in wax, Mr. Bate, junior, undertook to send to Mr. Saxton. But here the matter ended —the wax impression was never sent, and two months afterwards Mr. Saxton was informed that Mr. Bate had taken out a patent for an improved machine, particularly specifying the introduction of the diagonal tracer, which happened to be the same as his own. Mr. Saxton, disgusted with the turn which matters had taken, turned his attention to other mechanical inventions, and subsequently sold his machine to Mr. W. Trevylian, in whose hands it now remains. From that period nothing was done in the way of engraving from medals, and no step taken, either by Mr. Bate himself, or his friends, to bring his invention before the public; the invention, as it were, remained dormant in England.

It was towards the close of the year 1832 that M. Collas sold his patent to a few gentlemen, who, with the aid, and under the direction of some of the first French painters. sculptors, and engravers, united themselves in a company, under the firm of Lachevardiere and Co. It is to the enterprising spirit of these gentlemen that we are indebted for the "Tresor Numismatique et de Glyptique" (see *Athenæum*, No. 388, p. 261), which has now reached the extent of 600 plates of medals, bas reliefs, &c., representing upwards of 5000 subjects. This work has been widely circulated in France and throughout the continent: most of its plates, for beauty of effect and artist-like execution, leave the eye nothing to desire. It is needless to remind our readers, that the French company, just mentioned, has for some months been actively bestirring itself, for the purpose of applying the invention of M. Collas to the illustration of our medallic history; and, that a petition for the assistance and patronage of government to such a national work was laid before a Committee of the House of Commons during the recent session. These efforts have been met by a determined opposition on the part of certain of our native artists, who have attempted to quench the scheme, by bringing forward Mr. Bate's almost forgotten invention, in proof that the ground was pre-occupied, and by denouncing the French engravings as false, distorted, and mathematically inaccurate. In answer to the first plea, it is enough to state the fact, that nothing was done by Mr. Bate in the way of making his invention popular—no plan thought of, of applying it to a grand national undertaking—till the French company, with a superb work to point to as a specimen of *what their machine had effected*, laid their proposals and petition for Par-

liament. The second argument, a charge of mechanical inaccuracy brought against the French engravings, will be disposed of with equal ease, though not quite so briefly.

It will be admitted, without hesitation, that the best representation of any subject, as a work of art, is the one which shall convey the most faithful and pleasing impression of its general effect; that, as the said representation is to be judged of by a pair of eyes, and not by a pair of compasses, there are cases wherin the latter may *prove* a mathematical incorrectness, which the former will not acknowledge, and which, therefore, in no respect, impairs the merit of the copy. In examining a medal, *if it be laid flat upon a table*, all the effects of light and shade will disappear, and its bold outlines only strike the eye; whereas, *if it be taken up in the hand*, the relief becomes apparent, and the design is set off with the powerful aid of *chiaro-scuro*. The professed medallist may possibly prefer the first mode, as the best means of obtaining the exact proportions of the work before him; the general amateur and artist will assuredly give preference to the medal as seen in relief, being the more characteristic and pleasing aspect. It is to the faithful rendering of the latter effect, that the attention of the French engravers has principally been directed, at the necessary expense, in some cases, of geometrical exactness. A complaint, therefore, has been raised against their works, as unfaithful—they have been proved guilty of incorrectness, by the compasses, and the harsh word "distortion" has been liberally applied to them. But we are persuaded, that the weight of the objection is merely in the harshness of the word: the result of a careful examination of many specimens laid before us, has convinced us that there is no defect in the works executed by the French machine; there may, indeed, be occasional deficiency, inasmuch as, while the machine cannot give any thing but what is on the medal, it may not, in every instance, give *all* that is there. Granting, then, that the general effect of the medal, when held in the hand (that is, when seen in *chiaro-scuro*,) be faithfully and artistically rendered by the French machine, it is fruitless to *reason* about an imperfection, of which the compasses, and not the eye, are sensible. It should further be insisted upon, that this "incorrectness" with which the works of the French machine have been charged, is not necessary to it, but has been merely sanctioned for the sake of effect by the presiding artists, on the principle just laid down. Besides other engravings of geometrical exactness already produced, a plate is in preparation containing the Soane medal, the head of Henry the Fourth, the Ariadne, and other subjects, by which the proprietors are prepared to prove that the style of execution which they have adopted has been a matter of choice, and not enforced upon him by any defect in the machine.

The universal approbation given to the engravings of the "Tresor" by the artists and amateurs of the continent, who do not undervalue scrupulosity of outline and precision of drawing, may be quoted in support of the line of argument we have adopted: we may also, in confirmation, select a few passages from the evidence given before the Committee of the House of Commons upon the subject. Sir Francis Chantrey, when asked whether the mathematical inaccuracy objected to "produced an idea of distortion or any disagreeable effect to the eye," answered, that "it never produced any disagreeable effect to his eye, nor was he aware of it till it was pointed out to him;" and, therefore, he considered it of no very essential importance, and expressed his unqualified satisfaction in the engravings produced by the French machine. Mr. Hawkins, of the British Museum, when asked a similar question, gave a similar answer; he said that "a deviation, which is not visible to the eye, is not to be considered as a distortion;" and pronounced M. Collas's method as "giving the best idea of the medal of any method he had seen." Mr. Pistrucci, of the Mint, when examined before the Committee as to the merits of the French and English machines, gave it as his opinion, "that both are very clever, but each of them is deficient in that which makes the chief merit of the other: the French machine is beautiful and admirable for effect, and gives a correct idea of the work; but in a perspective view, or what I may call more appropriately foreshortening, it does not give the objects precisely as we see them, when we look at the centre of a real medal, but in chiaro-scuro, and with much effect. The English one gives it straight as far as I can judge: but I cannot say that it is mathematically correct with the original, not having had the original medal before me to compare it with; and it is possible that there may be a difference in the height, though not in the breadth of the objects rendered; but the engraving is flat and hard, with little or no effect."

We think that the above will suffice to convince our readers that the objections raised against the engravings produced by M. Collas's machine, are frivolous and futile. It is needless for us to repeat once again our opinions with respect to the feasibility and interest of the national work proposed; and if those who have any doubts on the subject, will examine the magnificent engravings of the portrait of Louis Phillppe, and the one from the bas-relief of the Canterbury Pilgrimage, we think they will be, like ourselves, fully satisfied that such a work could not be in better hands than those of M. Collas and his enterprising coadjutors. We have now only to describe the specimens:—

No. 1. Innocence prostrating herself before Justice, and entreating her protection; Violence is represented by a warrior holding a naked sword.—Sauvage.

2. Part of the Phygalian Frieze.

3. Cupid and Psyche; from a cameo by Louis Pikler, after a bas-relief by Thorwaldsen.

4. Vulcan forging the shafts of Cupid; from a cameo by Pikler, after a picture by Raffael Mengs.

5. Antigone and Ismena before the Temple of the Furies, urging Œdipus to return to Thebes; from a cameo in onyx by Louis Pikler.

6. The Heads of Augustus and Livia; from an ancient cameo in sardonyx.

7. Hercules stifling the Nemæan Lion; from a sculpture in bronze of the 15th century.*

* With every respect for our esteemed contemporary, we must say, that if the capabilities of M. Collas's machine are to be judged of from the specimens here referred to, its superiority is extremely questionable. The utmost that in our humble opinion, can be fairly said of them as works of art is, that they are striking and curious—considering how they have been produced—not that they are in themselves remarkable either for truth of delineation or excellence of finish. We have seen much better specimens of the art, both English and American.—Ed. M. M.

From the London Mechanics' Magazine.

So much has been said of Mr. Crosse and his experiments in electricity, that any information of his *modus operandi* will be eagerly received. The following peep into his labratory will be found highly interesting. The grandeur of the scale upon which he operates cannot fail to strike us with wonder.

MR. CROSSE'S GALVANIC AND ELECTRICAL APPARATUS.

In the *Brighton Herald* of Sept. 24, appeared, "An account of Sir Richard Phillips's visit to Andrew Crosse, Esq., of Broomfield, in the Quantock Hills, Somersetsbire, in September, 1836." Passing over a great deal of Sir Richard's preliminary twaddle (who, it will be seen, claims to have anticipated Mr. Crosse), we now lay before our readers his description of the extensive and splendid galvanic and electrical apparatus fitted up by Mr. Crosse, which is exceedingly interesting:—

"On reaching the handsome mansion of Mr. Crosse, I was received with much politeness, and found that I was the first visitor from Bristol. After breakfast, Mr. Crosse conducted me into a large and lofty apartment, built for a music-room, with a capital organ in the gallery; but I could look at nothing but the seven or eight tables which filled the area of the room, covered with extensive Voltoic batteries of all forms, sizes, and extents. They resembled battalions of soldiers in exact rank and file, and seemed innumerable.

"They were in many forms. Some in porcelain troughs of the usual construction; some like the *couronnes des tasses*; others cylindrical; some in pairs of glass vessels, with double metallic cylinders; besides them, others of glass jars, with stripes of copper and zinc. Altogether, there were 500 Voltaic pairs at work in this great room; and in other rooms about 500 more. There were besides another 500 ready for new experiments. It seemed like a great magazine for Voltaic purposes.

"There are also two large workshops, with furnaces, tools, and implements of all descriptions, as much as would load two or three wagons.

"In the great room there is also a very large electrical machine, with a 20 inch cylinder, and a smaller one; and in several cases all the apparatus in perfect condition, as described in the best books on electricity. The prime-conductor stood on glass legs, 2 feet high; and there was a medical discharger on a glass leg of 5 feet. Nothing could be in finer order; and no private

electrician in the world could, perhaps, show a greater variety both for experiments and amusement.

"Beneath the mahogany cover of a table, on which stood the prime conductor, &c., was enclosed a magnificent battery of 50 jars, combining 73 square feet of coating. Its construction, by Cuthbertson, was in all respects most perfect. To charge it required 250 vigorous turns of the wheel; and its discharge made a report as loud as a blunderbuss. It fuses and disperses wires of various metals; and the walls of the apartment are covered with framed impressions of the radiations from the explosion, taken at sundry periods. Mr. Crosse struck one while I was present; and he has promised me one as an electrical curiosity, and a memento of my visit.

"But Mr. Crosse's greatest electrical curiosity was his apparatus for measuring, collecting, and operating with atmospheric electricity. He collects it by wires the sixteenth of an inch, extended from elevated poles, or from trees to trees, in his grounds and park. The wires are insulated by means of glass tubes, well contrived for the purpose. At present he has about one-fourth of a mile of wire spread abroad; and in general about one-third of a mile. A French gentleman had reported to the Section at Bristol, that the wires extended 20 miles, filling the entire neighborhood with thunder and lightning, to the great terror of the peasantry, who in consequence left Mr. Crosse in the free enjoyment of his game and rabbits. This exaggeration Mr. Crosse laughed at most heartily, though he acknowledged that he knew that no small terror prevailed in regard to him and his experiments.

"The wires are connected with an apparatus in a window of his organ-gallery, which may be detached at pleasure, when too violent, by simply turning an insulated lever; but in moderate strength it may be conducted to a ball suspended over the great battery, which connected is charged rapidly, and is then discharged by means of an universal discharger. He told me that sometimes the current was so great as to charge and discharge the great battery 20 times in a minute, with reports as loud as cannon; which, being continuous, were so terrible to strangers that they always fled, while every one expected the destruction of himself and premises. He was, however, he said, used to it, and knew how to manage and control it; but when it got into a passion, he coolly, turned his insulating lever, and conducted the lightning into the ground. It was a damp day, and we regretted that our courage could not be put to the test.

"Every thing about this part of Mr. Crosse's apparatus is perfect, and much of it his own contrivance, for he is clever in all mechanical arrangements, and has been unwearied in his application, almost night and day, for thirty years past. I learned, too, that in the purchase and fitting up of his apparatus he has expended nearly 3000*l.* although in most cases he is his own manipulator, carpenter, smith, coppersmith, &c.

"About 12, Professor Sedgwick arrived, and in the afternoon one or two others, besides seven or eight gentlemen of the neighborhood, who had been invited to meet us at dinner, for Mr. Crosse unites to the rank of esquire that of a county magistrate, in the duties of which he is respected alike for his humanity to the poor and for his liberal opinions in politics. Mr. Crosse himself was educated at Oxford; and his second son holds the living of Broomfield. He is master of all his father's experiments; and, in spite of the complaints of an Oxford education, I found him to be a very expert mathematician, well read, and variously accomplished. We next morning renewed our survey, previous to fresh arrivals, and I took notes of every thing connected with his aqueous Voltaic batteries, in the following order, errors excepted:—

"1. A battery of 100 pairs of 25 square inches, charged, like all the rest, with water, operating on cups containing 1oz. of carbonate of barytes and powdered sulphate of alumine; intended to form sulphate of barytes at the positive pole, and crystals of alumine at the negative.

"2. A battery of 11 cylindrical pairs, 12 inches by 4. This, by operating six months on fluat of silver, had produced large hexahedral crystals at the negative pole, and crystals of silica and chalcedony at the positive.

"3. A battery of 100 pairs, of 4 square inches, operating on slate 832, and platina 3, to produce hexagonal crystals at the positive pole.

"4. A battery of 100 pairs, 5 inches square, operating on nitrate of silver and copper, to produce malachite at the positive pole; at the negative pole crystals already appear with decided angles and facets.

"5. A battery of 16 pairs, of 2 inches, in small glass jars, acting on a weak solution of nitrate of silver, and already producing a compact negatation of native silver.

"6. A battery (esteemed his best) of 813 pairs, 5 inches, insulated on glass plates on deal bars, coated with cement, and so slightly oxydated by water as to require cleaning but once or twice a year by pumping on them. I felt the effect of 458 pairs, in careless order and imperfectly liquidated, and they gave only some tinglings of the fingers; but this power in a few weeks produces decided effects.

"7. A battery of 12 pairs, 25 inches zinc and 36 copper, charged two months before with water, and acting on a solution of nitrate of silver, poured on green-bottle glass coarsely powdered. It had already produced a negatation of silver at the positive pole.

"8. A battery of 159 galley-pots, with semi-circular plates of $1\frac{1}{4}$ inch radius, placed on glass plates, and acting five months through a small piece of Bridgewater porous brick, on a solution of silex and potash. I saw at the poles small crystals of quartz.

"9. A battery of 30 pairs, similar to No. 8, acting since 27th July on a mixture, in a mortor of sulphate of lead, of white oxide of antimony, and sulphate of copper, and green sulphate of iron (205 grains), and three times the whole of green-bottle glass (615 grains). The result has been, in five weeks, a precipitation on the negative wire of pure copper in two days, and crystallised iron pyrites in four days. It had been expected to produce sulphurets of lead, copper, and antimony, by depriving the sulphates of their oxygen. On August 10th and 28th, 25 grains and 40 grains of sulphate of iron were added.

"10. A battery of 5 jars, with plates of different metals, as 2 copper and platina, 1 lead and lead, 1 silver and iron, and 1 copper and lead. Experimental.

"11, 12, and 13. About 200 pairs, in 3 batteries, working in a dark room, of which I took no note.

"While I was an inmate with Mr. Crosse, we had various conversations about the power which he employed. I had in some degree anticipated his *debut*, by hazarding, in the last edition of my 'Million of Facts, (1835), an assertion that, inasmuch as metals are found only in a mixed or confused state of different rocks, among which a galvanic action on air or water would necessarily arise, and in long time generate the compound or matrices of metals; but I did not regard this public anticipation as any interference with his original merits, and I was deeply penetrated by the view of his labors and the expense and zeal with which he had prosecuted his experiments. Yet he had a round conductor for a minimum of power, instead of a combination of flat or parallel ones for a maximum. And he could not help talking about the fluid and some other fancies of the elder electricians, who invented their doctrines before it was suspected that air was a compound, and that such active powers as oxygen, nitrogen, hydrogen, and their definite numerical co-mixtures, conferred mechanical character on the most refined operations of nature.

"He instructed me in the fact, that his batteries performed four times the duty in those hours in the morning, from seven to eleven, when the great laboratory of nature is envolving the most oxygen—than in the same period in the evening, when we may imagine the contrary effect takes place. He considered the air as so non-electric in damp weather, that no plate of air lying between the coating of a cloud and the earth could then be disturbed; and he stated to me, as a general fact, that the earth is always positively electrified.

"On my part, I enlarged to him and his son on the universality of matter and motion in producing all material phenomena, independently of the whimsical powers invented in ages when we would have been burnt for a magician; and in this way I endeavored to return the various information which he had unreservedly imparted to me. I impressed on him, that all this creative energy of atoms was merely a display of developements by the great motions of the earth as they affect the excitable parts of different solid bodies; the results of which are necessarily regular, and their ultimate laws of re-action and combination also regular, so as to produce that univer-

sal harmony which surprises beings, who in eternal time live and observe within only a unit of time. Hence that terrestrial galvanism, arising from the operations of the internal frictions and varied pressures called heat; hence those factitious productions of metallic matrices and crystalline galvanic effects, where different substances are proximately opposed; hence magnetism itself, tangentally displayed as a resultant of terrestrial currents of electricity; hence the fluctuations of the phenomena from obliquity of the axis of rotation, which in regard to the axis of the orbit generates two variable directions of massive pressure; hence, in fine, the wisdom displayed by Mr. Crosse in resorting to the *modus operandi* of Nature in his attempts to imitate her most curious productions.

"Observing that continual fresh arrivals rendered it ineligible for me to prolong my visit, I proceeded to Taunton, a distance of six or seven miles, the nearest place at which a stranger can meet with public accommodation."

WATER-TANKS.

At the late meeting of the Cornwall Polytechnic Society, a description was given of nine tanks, which had proved eminently useful during the late three dry summers on the Sussex property of Davies Gilbert, Esq., the President of the Society. As these tanks are cheaply and easily constructed, and not liable to decay like wooden vessels, and as rain enough falls on every house in England for the use of its inhabitants, no family would be deficient in good soft water who made a tank to *retain* it; and such tanks being paved over, take up no room.

The tanks at East Bourn vary in size: one of less than seven feet deep and wide has served two laborers' families for three years; whilst most of the springs in the neighborhood were dry.

A tank 12 feet by 7 had supplied with water a large family and six horses. This was surrounded by only 4½ inch brick-work resting solid against the sides, in consequence of being smaller at the bottom than higher up; and the dome is constructed on the Egyptian plan, by projecting horrizontally each row of materials one-third of their length beyond those below, and filling up the back with earth as it proceeded, to balance the weight of this projecting masonry.

At the East Bourn Workhouse for fourteen parishes, a tank has been made, 23 feet deep by 11 wide, of the roughest materials, being only flint stones, and though they require more mortar than if they had been regularly shaped, only 90 bushels of lime were allowed, including two coats of plaster, and the workmanship is executed like field walls at 10s. per 100 square feet; the only essential being, that *no* clay be used (which worms bore *through*,) and that the lime or Parker's cement be good.

A current of air is said to promote the purity of water in tanks, and this is easily effected by the earthenware or other pipe which conveys the rain from the roof, being six or eight inches in diameter, and an opening left for the surplus water to run away; and where the prevailing winds do not blow soot and leaves *on* the house, the water remains good, even for drinking, without clearing out the rubbish more than once a year; but in some cases filtering by ascension may be found useful, and be effected by the water being delivered by the pipe at the bottom of a cask or other vessel from which it cannot escape till it has risen through the holes in a board covered with pebbles, sand, or powdered charcoal.

Upwards of twenty laborers' gardens have been watered by the rain which formerly injured the public road, and was therefore turned into a sink well, which sink well was enlarged and surrounded by 9-inch masonry, and the water is drawn up by a *cast-iron curb*. This water was used in planting potatoes, and occasioned good crops in 1835, when setts not watered failed. And, should the profitable mode of *stall-feeding* now practised at Armagh be happily extended to England, and fatting oxen be kept *in pairs not tied up under shelter*, it will be found that preserving in tanks the water which falls on the barns and stalls will amply supply them, whilst it prevents the rain washing away the strength of the manure when straw is spread in the open yard.

Ponds have been made with equal success, dug 4½ feet only below the surface, what is excavated being added to the sides, and covered one foot thick like a road with pebbles and good lime mortar. Such ponds are become general on the dry soil of the South Downs for the use of the large flocks of sheep: and had such ponds been made in Romney Marsh, &c., during the late dry years, the sheep would not have died in such numbers as materially raised the price of meat in London.—[Bath and Cheltenham Gazette.]

EXTRACTION OF SUGAR FROM INDIAN CORN; BY M. PALLAS.—The results obtained by M. Pallas are as follows:

The stalk of the corn contains little or no sugar previous to flowering.

At the time of flowering, a small quantity of sugar may be detected.

When the grain is still soft, about 20 or 25 days after flowering, the plant contains abont 1 in 100 of crystallizable sugar.

When the grain is completely ripe, the stalk furnishes two parts in 100 of sugar, and 4 in 100 of rich and good-tasting molasses.

The residae remaining after the extraction of the sugar, may be given for food to cattle, or will serve for the manufacture of wrapping paper which will bring 11 francs for 50 kilogrammes.—[L'Institut, No. 157, 1836.]

TEA IN JAVA.—We learn from the Bengal Herald, of July 10th, that the tea-plant is now cultivated quite extensively in Java, and with great success. On the 17th o. May, there were more than 20,000 pounds ready for shipment; and in the course of a few years, the crop is expected to increase to a million pounds per annum.

METEOROLOGICAL RECORD

For the month of Snptember, 1836, kept at Avoylle Ferry, Red River, La., (Lat. 31° 10′ N. Long. 91° 59′ w.,) by P. G. VOORHIES.

SEPTEMBER.

Days.	Morn.	Noon.	Night.	Wind.	Weather.	REMARKS.
1	65	86	82	calm	clear	
2	68	84	81	..	..	
3	70	86	81	..	..	e'en'g cloudy, night thunder and rain
4	74	80	76	sw	cloudy	thunder, in the morning heavy storm
5	74	76	79	calm	..	rain in the morning and clear at noon
6	72	82	80	..	clear	foggy morning
7	70	84	76	..	..	rain in the morning
8	71	82	80	..	cloudy	heavy rain from the south at noon
9	72	82	74	..	..	rain at noon from the south
10	71	80	76	w	..	heavy thunder in the afternoon
11	71	86	74	calm	..	thunder in the morning and rain at noon
12	74	72	71	sw	..	heavy thunder and lightning, and rain at noon
13	72	79	82	calm	cloudy	all day
14	74	82	76	se	..	heavy rain in the morning and clear at noon
15	72	85	75	calm	..	in the morning, rain, and clear at noon
16	73	84	74	..	clear	
17	73	82	76	..	cloudy	at noon heavy rain from s. e., and rain all night
18	74	78	80	..	..	heavy rain in the morning and clear at noon
19	75	84	80	..	..	Red River rising & showers in the morning, clear at noon
20	76	84	75	..	..	cloudy in the morning and rain all day
21	75	84	76	..	clear	
22	74	83	73	..	..	
23	72	84	74	..	..	
24	75	81	75	sw	cloudy	clear at noon, Red River falling
25	73	84	74	calm	..	
26	74	82	80	..	..	clear at noon
27	72	85	83	..	clear	.. .. rain all night
28	73	82	76	..	cloudy	clear at noon
09	66	82	76	..	clear	
30	62	76	68	w	..	

Red River fell this month 5 feet 6½ inches—below high water mark 19 feet 4½ inches.

PATENT RAILROAD, SHIP AND BOAT SPIKES.

☞ The Troy Iron and Nail Factory keeps constantly for sale a very extensive assortment of Wrought Spikes and Nails, from 3 to 10 inches, manufactured by the subscriber's Patent Machinery, which after five years successful operation, and now almost universal use in the United States, (as well as England, where the subscriber obtained a patent,) are found superior to any ever offered in market.

Railroad Companies may be supplied with Spikes having countersunk heads suitable to the holes in iron rails to any amount and on short notice. Almost all the Railroads now in progress in the United States are fastened with Spikes made at the above named factory—for which purpose they are found invaluable, as their adhesion is more than double any common spikes made by the hammer.

* * All orders directed to the Agent, Troy, N. Y., will be punctually attended to.

HENRY BURDEN, Agent.

Troy, N. Y., July, 1831.

* * Spikes are kept for sale, at factory prices, by I. & J. Townsend, Albany, and the principal Iron Merchants in Albany and Troy; J. I. Brower, 222 Water street, New-York; A. M. Jones, Philadelphia; T. Janviers, Baltimore; Degrand & Smith, Boston.

P. S.—Railroad Companies would do well to forward their orders as early as practicable, as the subscriber is desirous of extending the manufacturing so as to keep pace with the daily increasing demand for his Spikes. (1J23am) H. BURDEN.

RAILWAY IRON, LOCOMOTIVES, &c

THE subscribers offer the following articles for sale.

Railway Iron, flat bars, with countersunk holes and mitred joints,

							lbs.	
350 tons	2½	by	½,	15 ft in length, weighing			4 63/100	per ft.
280	" 2	"	½,	"	"	"	3 50/100	"
70	" 1¾	"	½,	"	"	"	2½	"
80	" 1½	"	½,	"	"	"	1 25/100	"
90	" 1	"	½,	"	"	"	½	"

with Spikes and Splicing Plates adapted thereto. To be sold free of duty to State governments or incorporated companies.

Orders for Pennsylvania Boiler Iron executed.

Rail Road Car and Locomotive Engine Tires, wrought and turned or unturned, ready to be fitted on the wheels, viz. 30, 33, 36, 42, 44, 54, and 60 inches diameter.

E. V. Patent Chain Cable Bolts for Railway Car axles, in lengths of 12 feet 6 inches, to 13 feet 2¼, 2¾, 3¼, 3½, and 3¾ inches diameter.

Chains for Inclined Planes, short and stay links, manufactured from the E. V. Cable Bolts, and proved at the greatest strain.

India Rubber Rope for Inclined Planes, made from New Zealand flax.

Also Patent Hemp Cordage for Inclined Planes, and Canal Towing Lines.

Patent Felt for placing between the iron chair and stone block of Edge Railways.

Every description of Railway Iron, as well as Locomotive Engines, imported at the shortest notice, by the agency of one of our partners, who resides in England for this purpose.

Mr. Solomon W. Roberts, a highly respectable American Engineer, resides in England for the purpose of inspecting all Locomotives, Machinery, Railway Iron &c. ordered through us

A. & G. RALSTON.

28-tf Philadelphia, No. 4, South Front st.

STEPHENSON,

Builder of a superior style of Passenger Cars for Railroads.

No. 264 Elizabeth street, near Bleecker street, New-York.

RAILROAD COMPANIES would do well to examine these Cars; a specimen of which may be seen on that part of the New-York and Harlaem Railroad now in operation J25tf

NEW ARRANGEMENT.

ROPES FOR INCLINED PLANES OF RAILROADS.

WE the subscribers having formed a co-partnership under the style and firm of Folger & Coleman, for the manufacturing and selling of Ropes for inclined planes of railroads, and for other uses, offer to supply ropes for inclined planes, of any length required without splice, at short notice, the manufacturing of cordage, heretofore carried on by S. S. Durfee & Co., will be done by the new firm, the same superintendant and machinery are employed by the new firm that were employed by S. S. Durfee & Co. All orders will be promptly attended to, and ropes will be shipped to any port in the United States.

1st month, 7th, 1836. Hudson, Columbia County State of New-York.

ROBT. C. FOLGER,
33—tf. GEORGE COLEMAN,

A SPLENDID OPPORTUNITY TO MAKE A FORTUNE.

THE Subscriber having obtained Letters Patent, from the Government of France, granting him the exclusive privilege of manufacturing Horse Shoes, by his newly invented machines, now offers the same for sale on terms which cannot fail to make an independent fortune to any enterprising gentlemen wishing to embark in the same.

The machines are in constant operation at the Troy Iron and Nail Factory, and all that is necessary to satisfy the most incredulous, that it is the most VALUABLE PATENT, ever obtained, either in this or any other country, is to witness the operation which is open for inspection to all during working hours. All letters addressed to the subscriber (post paid) will receive due attention.

Troy Iron Works, HENRY BURDEN.

N. B. Horse Shoes of all sizes will be kept constantly for sale by the principal Iron and Hard-ware Merchants, in the United States, at a small advance above the price of Horse Shoe Iron in Bar. All persons selling the same, are AUTHORISED TO WARRANT EVERY SHOE, made from the BEST REFINED IRON, and any failing to render THE MOST PERFECT SATISFACTION, both as regards workmanship and quality of Iron, will be received back, and the price of the same refunded. H. BURDEN. 47—tf

FRAME BRIDGES.

THE subscriber would respectfully inform the public, and particularly Railroad and Bridge Corporations that he will build Frame Bridges, or vend the right to others to build, on Col. Long's Patent, throughout the United States, with few exceptions. The following sub-Agents have been engaged by the undersigned who will also attend to this business, viz.

Horace Childs,	Henniker, N. H.
Alexander McArthur,	Mount Morris, N. Y.
John Mahan,	do do
Thomas H. Cushing,	Dover, N. H.
Ira Blake,	Wakefield, N. H.
Amos Whitemore, Fsq.,	Hancock, N. H.
Samuel Herrick,	Springfield, Vermont.
Simeon Herrick,	do do
Capt. Isaac Damon,	Northampton, Mass.
Lyman Kingsly,	do do
Elijah Halbort,	Waterloo, N. Y.
Joseph Hebard,	Dunkirk, N. Y.
Col. Sherman Peck,	Hudson, Ohio.
Andrew E. Turnbull,	Lower Sandusky, Ohio.
William J. Turnbull,	do do
Sabried Dodge, Esq.,	(Civil Engineer,) Ohio.
Booz M. Atherton, Esq.	New-Philadelphia, Ohio.
Stephen Daniels,	Marietta, Ohio
John Rodgers,	Louisville, Kentucky.
John Tillson,	St. Francisville, Lous'a.
Capt. John Bottom,	Tonawanda, Penn
Nehemiah Osborn,	Rochester, N. Y.

Bridges on the above plan are to be seen at the following localities, viz. On the main road leading from Baltimore to Washington, two miles from the former place. Across the Metawamkeag river on the Military road, in Maine. On the national road in Illinois, at sundry points. On the Baltimore and Susquehanna Rrailroad at three points. On the Hudson and Patterson Railroad, in two places. On the Boston and Worcester Railroad, at several points. On the Boston and Providence Railroad, at sundry points. Across the Contocook river at Hancock, N H. Across the Connecticut river at Haverhill, N. H. Across the Contoocook river, at Henniker, N. H. Across the Souhegan river, at Milford, N. H. Across the Kennebec river, at Waterville, in the state of Maine.—Across the Genesse river, at Mount Morris, New-York, and several other bridges are now in progress

The undersigned has removed to Rochester, Monroe county, New-York, where he will promptly attend to orders in this line of business to any practicable extent in the United States, Maryland excepted.

MOSES LONG.
General Agent of Col. S. H Long
Rochester, May 22d, 1836. 19y-tf.

AN ELEGANT STEAM ENGINE AND BOILERS, FOR SALE.

THE Steam Engine and Boilers, belonging to the STEAMBOAT HELEN, and now in the Novelty yard, N. Y. Consisting of one Horizontal high pressure Engine, (but may be made to condense with little additional expense) 36 inches diameter, 10 feet stroke, with latest improved Piston Valves, and Metalic packing throughout.

Also, four Tubular Boilers, constructed on the English Locomotive plan, containing a fire surface of over 600 feet in each, or 2500 feet in all—will be sold cheap. All communications addressed (post paid) to the subscriber, will meet with due attention.

HENRY BURDEN.
Troy Iron Works, Nov. 15, 1836. 47—tf

HARVEY'S PATENT RAILROAD SPIKES.

THE Subscribers are manufacturing and are now prepared to make contracts for the supply of the above article. Samples may be seen and obtained at Messrs. BOORMAN, JOHNSON, AYRES & Co. No. 119 Greenwich Street, New-York, or at the Makers in Poughkeepsie, who refer to the subjoined certificates in relation to the article.

HARVEY & KNIGHT.
POUGHKEEPSIE, October 25th, 1836.

The undersigned having attentively examined HARVEY'S PATENT FLANCHED and GROOVED SPIKES is of the opinion, that they are decidedly preferable for Railroads to any other Spikes with which he is acquainted; and shall unhesitatingly recommend their adoption by the different Railroad Companies whose works he has in charge.

BENJ. WRIGHT,
Chief Engineer N. Y. & E. R. R.
NEW-YORK, April 4th, 1836.

Harvey's Flanched and Grooved Spikes are evidently superior for Railroads to those in common use, and I shall recommend their adoption on the roads under my charge if their increased cost over the latter is not greater than some twenty per cent.

JNO. M. FESSENDON, Engineer.
BOSTON, April 26th, 1836. NO. 1—6t.

ARCHIMEDES WORKS.

(100 North Moor street, N. Y.)
NEW-YORK, February 12th, 1836.

THE undersigned begs leave to inform the proprietors of Railroads that they are prepared to furnish all kinds of Machinery for Railroads, Locomotive Engines of any size, Car Wheels, such as are now in successful operation on the Camden and Amboy Railroad, none of which have failed—Castings of all kinds, Wheels, Axles, and Boxes, furnished at shortest notice.

H. R. DUNHAM & CO.
4—vtf

ALBANY EAGLE AIR FURNACE AND MACHINE SHOP.

WILLIAM V. MANY manufactures to order, IRON CASTINGS for Gearing Mills and Factories of every description

ALSO—Steam Engines and Railroad Castings of every description.

The collection of Patterns for Machinery, is not equalled in the United States. 9—1y

TO CONTRACTORS

STONE CUTTERS and MASONS.

JAMES RIVER and KANAWHA CANAL.—Contractors for mechanical work are hereby informed that a large amount of Masonry, consisting of Locks, Culverts, and Aqueducts, is yet to be let on the line of the James and Kanawha Canal.

Persons desirous of obtaining such work, and prepared to exhibit proper testimonials of their ability to execute it, will apply at the office of the subscriber in the city of Richmond

Stone Cutters and Masons wishing employment in the South during the winter months, may count with certainty on receiving liberal wages, by engaging with the contractors on the work

CHAS. ELLET, Jr., Chief Eng. J. R. & K. Co.
Richmond, Nov. 29, 1836. 51—6t

AMES' CELEBRATED SHOVELS, SPADES, &c.

300 dozens Ames' superior back-strap Shovels
150 do do do plain do
150 do do do caststeel Shovels & Spades
150 do do Gold-mining Shovels
100 do do plated Spades
50 do do socket Shovels and Spades.

Together with Pick Axes, Churn Drills, and Crow Bars (steel pointed,) manufactured from Salisbury refined iron—for sale by the manufacturing agents,

WITHERELL, AMES & CO.
No. 2 Liberty street, New-York.
BACKUS, AMES & CO.
No. 8 State street, Albany

N. B—Also furnished to order, Shapes of every description, made from Salsbury refined Iron v4—tf

NOTICE TO CONTRACTORS.

Proposals will be received at the office of the Hudson and Berkshire Railroad Company, in the city of Hudson, until the 15th of January, 1837, for One Million feet, board measure, of Southern pine, of the following dimensions:—6 inches square, and in lengths of 21, 24, 27, and 30 feet long—also, for 14,000 Chestnut or Cedar ties, 8 feet long, and 6 inches square—and also, 4,000 sills, of Hemlock, Chestnut, or White Pine, 4 by 10 inches, and in lengths of 15, 18, and 21 feet long. The whole to be delivered by the 1st day of July, 1837. GEORGE RICH.
Engineer.
Hudson, Dec. 22, 1836. 52 4t